



FRIDAY, AUGUST 14, 1896.

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## Contributions.

## New Express Trains in England.

LONDON, July 30, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Year by year, as July comes round and the summer services are announced, the British public are accustomed to look for fresh stars in the railway firmament in the shape of new express trains. Nor is the British public as a rule disappointed. This year, however, a perfect constellation of new stars has blazed forth. So much so that, whereas two or three months back I was only able to enumerate 35 runs per diem of 100 miles and upward without a stop, a writer in a recent number of *Engineering* reckons up no less than 58 similar runs. Several of this latter number, I should say, are made by Caledonian trains which were in existence at the earlier date, but which I did not include in my list because they stop en route, though not indeed at a station, and divide into, or, as the case may be, connect together, two portions. But even neglecting these, the increase is remarkable enough.

Where the South Western, for instance, had one run between London and Christchurch (104 miles) it now has two; where the Midland had one between London and Nottingham (124 miles), it now has three; where the North Eastern had three between Newcastle and Edinburgh (124½ miles) it now has six; the North Western has put on a second train running from London to Carlisle (299 miles) with only one intermediate stop, and the Great Northern runs from London to Grantham (105½ miles) have increased from 12 to 14. In addition to this there are several runs between new points. The Great Western, for example, has admirable new expresses between London on the one hand and Birmingham and Liverpool on the other, and these trains cover the 106 miles between London and Leamington in both directions without a stop in 120 minutes. The Great Northern has a new Scotch express which runs in both directions between London and Newark (120 miles) without a stop. The time allowed on the journey down is 140 minutes and 150 minutes in the reverse direction. There is also a run from Peterborough to York (111½ miles) in 121 minutes. The North Western replies to this by running its up Scotch express through from Preston to Rugby, a distance of 126½ miles, in 152 minutes.

One of the most remarkable things about the West Coast (North Western and Caledonian) services is that the speed is highest where the road is hardest. The 8 o'clock p. m. from Euston, for instance, is timed as far north as Crewe over a very easy road no higher than 48 miles per hour; on the 250 miles between Wigan and Perth, in the course of which the line twice rises to heights of 1,000 ft., falling back in between to the level of the sea, the speed is over 56 miles an hour. Between Perth and Forfar, a distance of 32½ miles, this train is only allowed 32 minutes—the first time, I believe, in this country that a speed has been booked at over 60 miles an hour. The new Caledonian engines of the "Dunalastair" type are evidently doing most splendid work.

The last few years have seen an enormous improvement in the convenience of the services between London and Scotland. Up to three years ago a passenger, unless indeed he chose to start from London with the newspapers at 5:15, or with the mail at 7:15 in the morning—times both of them much too early for English habits—practically had the choice between starting at 10 in the morning or else between 8 and 10 in the evening. In 1893, afternoon expresses leaving about 2 and reaching Glasgow and Edinburgh (roughly 400 miles) about 10:30 were introduced, and they are the most popular and the most crowded trains in the service. Last year there were put on night trains at 11:30 and 11:50 by the two lines, respectively, so that passengers could spend the evening at a theater in London and yet reach their des-

tinuation in time for breakfast next morning. This summer there is a yet further development. Scotch expresses leave Euston and King's Cross at 11:20 and 11:30 respectively for the accommodation more especially of passengers who have to travel up to the London termini from outlying districts, the time of arrival in Glasgow and Edinburgh being, roughly, 8 o'clock.

Against all this improvement from London northward and westward the lines to the South and East have, with the exception of the Chatham and one new express on the South Eastern, but little to show. It is true there is an acceleration of three-quarters of an hour on the night mail between London and Paris, but the main credit of this belongs, of course, to the French companies. On the other hand, the promised afternoon service between London and Paris via Boulogne has fallen through, on account, it is said, of difficulties in connection with the depth of water in Boulogne Harbor.

I ventured, a month or two back, to say that English expert opinion demurred to Monsieur Colson's view that "competition is the most burdensome and least efficacious method of securing to the public good and cheap railway service." An apt commentary on this text is furnished by the article in *Engineering* to which I have already alluded. It is there pointed out that between London, the largest city in the world, and Brighton, which is not only the nearest point on the sea coast to London, but also probably the largest pleasure city in the world, with a population of about 120,000, one railway company has a monopoly of the service. There are five trains a day only which cover the 50½ miles between London and Brighton without a stop. The speed of the best of them is under 47 miles an hour. Three out of the five carry first-class passengers only. One alone admits third-class passengers. Shrewsbury and Here-

ford, on the other hand, which lie precisely the same distance apart as Brighton and London, are two third-rate country towns situated on one of the two competitive routes which carry the comparatively insignificant cross-country traffic between the West and North of England. Between Shrewsbury and Hereford there are 12 expresses per diem run through without a stop. As a matter of course they all take third-class passengers. The fastest of them is timed at over 50 miles an hour; the slowest of the whole batch is faster than all except one of the Brighton Company's five. Here is *Engineering's* conclusion from the above piece of evidence: "Competition may be an expensive luxury, but at all events it is a most effective stimulant, and we hope it may be long ere this factor is eliminated from our English railway system."

W. M. ACWORTH.

## A Ride on a Richmond Freight Compound.

In our issue for April 3, 1896, we published a short article giving an account of a ride on a Richmond compound locomotive hauling an express passenger train on the Southern Railway between Danville, Va., and Charlotte, N. C. In that article special mention was made of the easy-riding qualities of the engine, its facility of starting the train, and the exact similarity of handling existing between it and the simple engine. The question has since arisen as to how these engines would behave in heavy freight service and on steep grades.

It may not be generally known, but the freight trains on the mountain section or old main line of the Chesapeake & Ohio, between Clifton Forge and Charlottesville, Va., are all hauled by compound consolidation locomotives, built at Richmond. These engines were put in service in February last, and are known in the classification of the road as G-5. They are identical with the G-1 class, which they have superseded in every particular with the exception of the compound cylinders and an increased thickness of the boiler plates, allowing a pressure of 200 lbs. per square inch to be carried.

The accompanying profile of the road shows the grades that exist on the division; that of North Mountain with its grade of 68 ft. to the mile and over for a distance of seven miles being the hardest pull for the eastbound trains.

When the engines were first put into service it was soon learned by the men that, with the emergency valve open, thus converting the machine into a simple engine, the new locomotives were much more powerful than those they were to replace, and they were overloaded with trains of 750 tons, instead of the 550 tons of the old engines. This resulted in a somewhat extravagant use of coal, but the trains were even then hauled at a saving over the simple engines. This practice was soon stopped, and a regular lading of 650 tons, consisting of from 16 to 18 loaded cars, was assigned to them. The extra tonnage over the other engines was due partly to the extra weight on the drivers and partly to the greater efficiency of the compound.

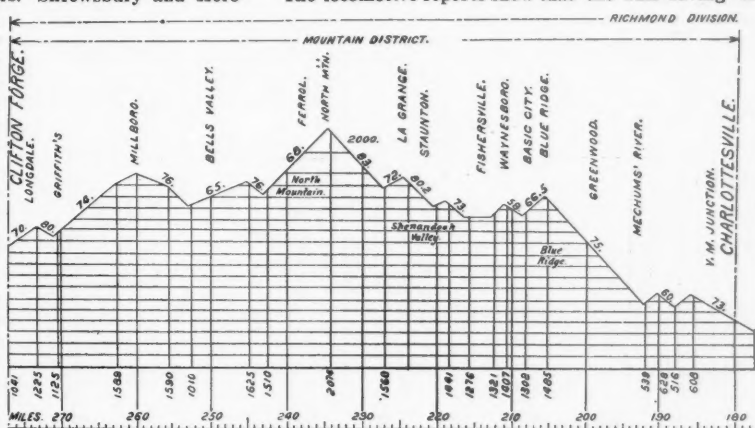
A representative of this paper recently rode on one of these engines from Clifton Forge to Charlottesville. The train weighed 650 tons and consisted of 18 cars, nine of which were fitted with air brakes. The rails were dry

and clean. Just at the start there is a slight down grade, so that the train was started with the emergency valve closed and the automatic intercepting valve converted the engine into a compound immediately after the first exhaust from the high-pressure cylinder. The engine worked up the first grade at a speed of about ten miles an hour and the reverse lever in the ninth notch from the corner, at which point it was kept for nearly the whole run. This corresponds to a cut-off of about 14 in. In climbing the next hill of 74 ft. to the mile, running into Millboro, a very heavy shower was encountered and the speed dropped down to about four or five miles an hour, which was the slowest on the trip.

A stop was made for water at three points on the run where an adverse grade existed. In starting from these positions the reverse lever would be dropped down in the corner, the emergency valve opened and the engine worked simple for from 10 to 15 rods, when the valve in the cab would be closed and the engine converted to a compound, then, in from 15 to 20 rods further the reverse lever would be drawn back to the regular point of cut-off that the engineer seems to have adopted for this work. Therefore, with the single exception that the emergency valve was opened when starting on a heavy grade, the engine was handled in every way as the simple engine would have been.

As for the steaming qualities, the lowest point touched during the day was 195 lbs., and the pointer vibrated between that and the 200-lb. mark. The firing was easy and the fireman was never crowded in his work. The crews are the same that had previously run the simple engines, so that the plea of special skill and picked men cannot be made to account for the fine behavior of these engines.

The locomotive reports show that the fuel saving is



Profile of the Mountain District, Richmond Division, Chesapeake &amp; Ohio Railroad.

about 20 per cent. over the consumption of the simple engines and the train loads are 100 tons greater. The distance from Clifton Forge to Charlottesville is 96 miles, so that an engine running over the division 25 days in the month will make a mileage of 2,400 miles a month or 28,800 miles a year, giving an extra ton-mileage, in accordance with the loading adopted, of 2,880,000. If the paying load is placed at 63 percent of the total weight of train we have a paying ton-mileage of 1,814,400, which at four mills to the ton-mile will amount to an extra earning of \$7,257 in one year, or enough to help some what in paying for the engine. This, of course, takes no account of the saving in fuel, which the coal records of the road say amount to about 20 per cent. on a basis of ton mileage.

As for other matters, such as easy riding when the speed is increased, the slipping of drivers, etc., it can only be said that there is no apparent difference between the action of this engine and of a simple one whose place it has taken.

## Track Elevation.—Milwaukee Division, Chicago &amp; Northwestern Railway.

(Continued from page 549.)

**Subway Plans.**—The subways at the different street intersections are very similar. For example, that at Belmont avenue will have a vertical clearance of 13.5 ft., a driveway 38 ft. between curbs, with sidewalks on either side of the driveway 14 ft. wide. Both sidewalks and drive will be paved with brick. As West Ravenswood Park and North Wood street run parallel with the railroad tracks at this point and meet Belmont avenue at the entrance to the subway, the work necessary at this point will be considerably greater than at the majority of the crossings, as all these streets must be provided for. The approaches have a very moderate grade, 3.5 ft. in 100 ft., and allow ample room for wagon traffic.

At some subways sewer pipes are encountered, which, on account of the excavation necessary, are left too near the surface. At these points the sewers are branched and carried on the old level back of the masonry walls.

**Masonry.**—Fig. 9 shows one type of masonry abutments used. It is the masonry plan as used at Irving Park Boulevard, where the width of the subway is 100 ft. At this subway the girders are supported at the center by four iron pillars on stone pedestals. Here the driveway is 60 ft. wide, with two 20-ft. sidewalks. The abutments rest on concrete foundations 8 ft. wide and 5 ft. deep. The foundations for the center pedestals



of concrete 8 ft. square and 5 ft. deep. Hard limestone is used throughout this work, it being cut to dimensions at the quarry. The face of the abutment, back wall and coping are of rock-faced, dimension stone, the coping stones under the bridge seats being the only ones dressed. The back wall is rubble work, excepting the steps at the slope.

**Iron Work.**—Fig. 10 shows some details of the iron work and floor system for a 66-ft., clear-span bridge, the girders being 70 ft. from center to center of end floor beams, and 6 ft. high. These girders are built up as follows, commencing at top and going down:

One cover plate.....	16 in. × ½ in. × 32 ft. 0 in.
" " " " " " " "	16 " × ½ " × 42 " 0 "
" " " " " " " "	16 " × ½ " × 56 " 7 "
" " " " " " " "	16 " × ½ " × 53 " 3½ "
Two angles.....	6 " × 6 " × ¾ in. × 61 ft.
Two side plates.....	12 in. × ¼ in. × 68 ft. 5 in.
Web plate (steel) center section.....	71¾ " × ¼ " × 19 " 11½ "
" " " " " " " " " " " "	71¾ " × ¼ " × 24 " 11½ "
Two side plates.....	12 " × ¼ " × 69 " 11½ "
" " " " " " " " " " " "	6 " × 6 " × ¾ in. × 70 "
One cover plate.....	16 in. × ½ in. × 70 ft. 8 in.
" " " " " " " " " " " "	16 " × ½ " × 51 " 3 "
" " " " " " " " " " " "	16 " × ½ " × 42 " 0 "
" " " " " " " " " " " "	16 " × ½ " × 32 " 0 "

The girders are strengthened by vertical angles placed every 5 ft. throughout their entire length. The girders have 1½ in. camber, of which ¾ in. will be taken out by varying the thickness of the timber stringers, leaving ¾ in. camber in the rail. All rivets in the girders are ¾ in.

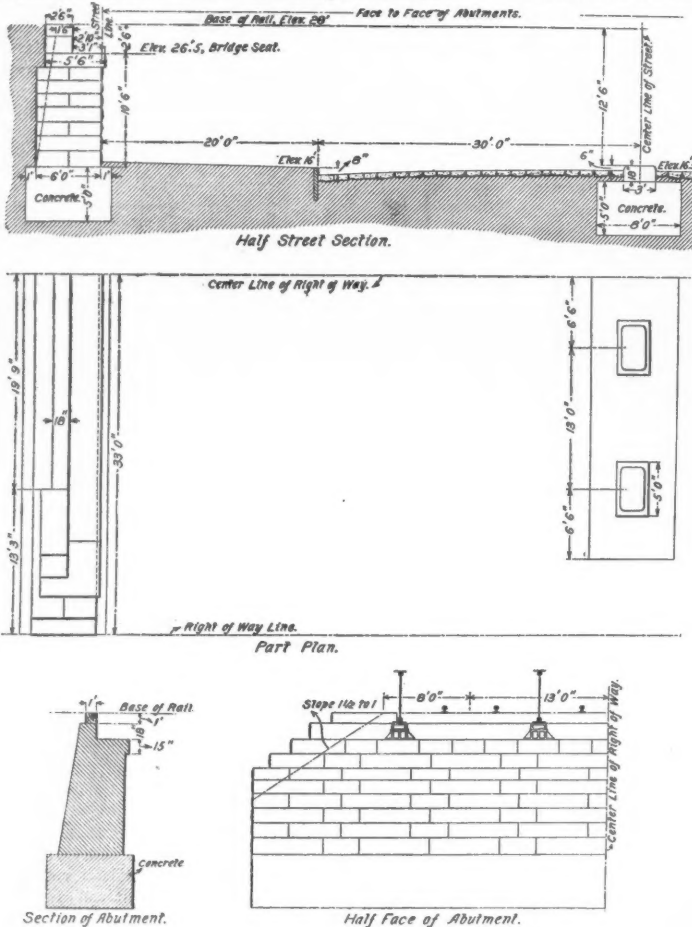


Fig. 9.—Masonry at Irving Park Boulevard—C. & N. W. Track Elevation.

diameter, while in the floor ¾-in. diameter rivets are used. The girder flanges, floor beams and all rivets are of wrought iron, the other materials being steel. The distance from center to center of girders is 13 ft., from center to center of stringers 4 ft. 11 in., from center of girder to center of stringer 4 ft. ½ in., and from center to center of floor beams 5 ft. The end plates are fastened to the bridge with bolts so as to be removable.

The floor beams are built up, and consist of a 9½-in. × 7-in. filler plate, between two 10-in. 23½-lb. channels. The top plate is 7 in. × ¾ in., while the bottom plate is 10 in. × ¾ in. The stringers are cut away to allow for the upper flange of the floor beams, and are carried on 3½ in. × 3½ in. × ½ in. shelf angles, riveted to the web of the floor beams. The stringers consist of two 3½-in. × 6-in. × 3½-in. × ½-in. "Z" bars, with a bottom plate 16½ in. × ½ in. This box carried an oak stringer 6 in. × 16 in., which in turn carries the rail plate and rail. The rail plate used is 8 in. × ½ in. × 12 in., and the rail weighs 80 lbs. per yard. Cast-iron clip washers and ¾ in. bolts passing through the oak timbers and bottom plate of the stringer hold the rail firmly in place. Five-in. × 3½-in. × ½-in. angles riveted to the upper flanges of the "Z" bars on either side of the stringer form the guard rails.

It will be noted that the filler plate in the floor beam is the same thickness as the gusset plate riveted to the girder. The filler does not extend to the end of the floor beam, but is only of such length as to permit the floor beam to be lowered into place from above, the gusset plate being between the floor beam channels when in position, and are held together by means of 10½-in. rivets.

The deck plates are of ½-in. steel and are slotted where

they meet the gusset plates and are secured to angles, riveted to the girders and gusset plates on one side, and are held by the stringers and floor beams on the others, so that there is a solid floor over the entire structure.

**Cost.**—It is estimated that the cost of raising the line over the entire distance covered by these plans will be \$1,000,000. Each of the 20 bridges will cost \$25,000. It is through the courtesy of Mr. Louis H. Evans, Engineer of Track Elevation, of the Chicago & Northwestern Railway, that we are enabled to publish the plans and description of this important work.

#### The Advertising of Freight Time from New York.

For some years the Wabash Railroad has been freely distributing a circular showing the time made by some of the freight trains westbound. This circular was originally about the size of a sheet of square notepaper. In front is the well-known Wabash trade-mark, and a map is on the back, while inside, besides lists of agents and connections, is a "checker-board" arrangement giving the hours in transit between important stations. This circular now appears also in a miniature form. Until recently, however, the leaving hour was omitted, and as no other road followed the Wabash example the New York merchant had to trust to the unaided eloquence of the soliciting agent to ascertain what the railroads had to sell in the matter of service, at least as far as Toledo.

Last fall, however, there was a change, and a number of the fast freight lines operating out of New York got out "flyers" advertising their wares. We have collected a number of these circulars, but as they are not all dated we cannot say with certainty which line was first to follow the Wabash. The red and black circular of the Interstate Despatch is, however, one of the earliest ones. It is a single sheet, note size, dated Oct. 15, 1895, and calls the "atten-

circular, but with the change that the time is only given from New York and for their "train 77." Merchants are also called on to "Remember, you can ship at Duane street up to 4:30 p. m." It is a little hard to realize that this same train 77 can run to 18 principal points in the west, including such distant cities as St. Paul, Kansas City and Memphis, but as the time in hours is given to each one it is to be expected that the shipper, at least, will believe this. The time to Chicago is the standard 60 hours. To Cleveland the Erie beats the West Shore two hours, while to St. Louis it admits 63 hours. The chief difficulty with the circular, however, is the lack of assurance that through cars are run to all the 18 points named. Unless this is done the time quoted cannot be made.

So far the New York advertisements appeared under the name of the various fast freight lines, but this spring the Baltimore & Ohio Railroad came out with a flyer very like the Erie Despatch. The map is omitted, however, and the train is No. "97." These trains, it would seem, must at least end with the lucky number. This 97 is another of the omnipresent trains and runs to 13 points sprinkled between St. Paul, Omaha, Evansville and Pittsburgh. To Chicago and St. Louis, the B. & O. claims the standard 60 hours. To Cleveland they are satisfied with 38 hours, while their 44 hours to Cincinnati is 16 hours better than the Erie Railroad's 60. The B. & O., however, demands a delivery at pier 22 by 4 p. m. This indicates an arrival at Cincinnati at 1 p. m., which would seem to be a little late.

The last of these circulars is a single leaf, reading "Try the Empire Line fast freight train A1 on through cars 2½ days to Chicago." The scoffer might expect to find the cars on the train rather than the train on the cars, but this is immaterial. A new feature is introduced in the list of receiving stations, five in New York, six in Philadelphia and three in Baltimore. These are, of course, stations of the Pennsylvania Railroad, which operates the line in connection with the Lehigh Valley and Lake Shore. The fault of all these last three circulars lies in the improbability of their being daily cars loaded from and to all the points mentioned.

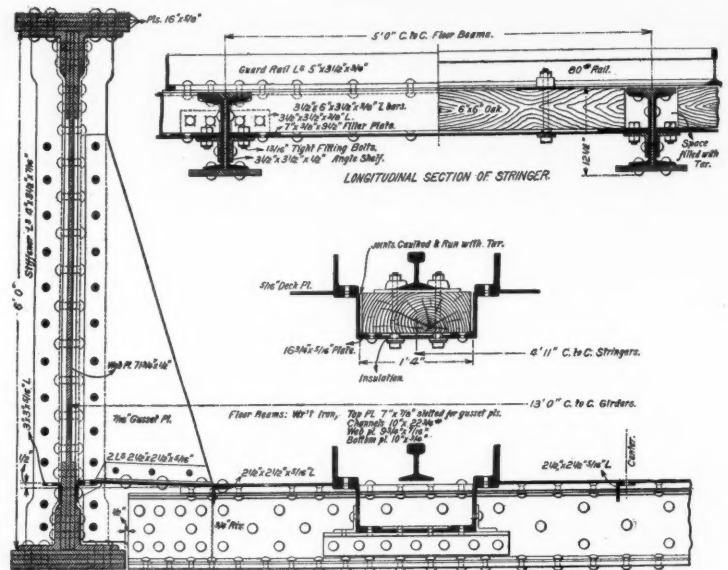


Fig. 10.—Detail of Bridge Floor—C. & N. W. Track Elevation.

tion of the shipping public in New York City and Chicago to the 60-hour train, New York to Chicago, recently established." The circular is explicit in stating that freight must be delivered at the Erie piers 20 and 21, North River, before 4:30 p. m., and names the delivering station (the Nickel Plate's) in Chicago. It is not stated that through cars are run irrespective of the amount of shipments offered, but this is clearly inferable.

The Hoosac Tunnel Line and West Shore Line also came out with similar circulars, advertising 60-hour trains to Chicago, both, however, requiring delivery of freight at the West Shore pier No. 23, North River, before 3 p. m. This shutting off the freight an hour and a half before the usual time for closing the stations is probably inconvenient to merchants who ship on telegraphic order, but it undoubtedly results in a very early departure of the train from Weehawken, as there is no local freight then in the way.

The Hoosac Tunnel Line's circular is note size and printed in purple, but the West Shore is smaller and printed on a card in red and black, with a hole punched in the top to hang it up by. This West Shore card gives the number of the train "57" especial prominence.

The West Shore Line, not satisfied with its bid for the Chicago trade, has also issued circulars in style almost identical with that of the Interstate Despatch, advertising a "36-hour train, New York to Cleveland," and a "60-hour train, New York to St. Louis." It is to be noted that of all these the Cleveland train is the only one "recently established," but the circular, which is dated Dec. 15, 1895, goes on to say that the service has been successfully maintained for eight months.

The Erie Despatch also came out with a flyer last fall in very much the same shape as the Wabash miniature

It is perhaps remarkable that the Union Line and the Merchants' Despatch, the recognized fast freight lines of the Pennsylvania, and the New York Central have not as yet taken part in this diffusion of intelligence. But probably most of the shipping clerks know very well already what time they make. There would, however, seem to be no greater objection to advertising freight trains than passenger trains, if only the advertised time is made.

#### Schenectady Mogul Locomotives for the Maine Central Railroad.

The engraving, from a photograph, shows a mogul locomotive recently built by the Schenectady Locomotive Works for the Maine Central Railroad. This is one of a lot of five which were built to conform to specifications furnished by Mr. Amos Pillsbury, Superintendent of Motive Power of the Maine Central, who states that the engines are giving excellent satisfaction and are very economical in fuel. It will be observed that the boiler is of the extended wagon-top type with large grate surface, namely 26.96 sq. ft. The engines have a low cab and a full deck and are convenient for engineer and fireman, the arrangement of the attachments in the cab being the same as on the ordinary American type of 8-wheel locomotives. Descriptive specifications follow:

##### General Dimensions.

Gage.....	4 ft. 8½ in.
Fuel.....	Bituminous coal
Weight in working order.....	136,800 lbs.
" " on drivers.....	117,600 lbs.
Wheel base, driving.....	14 ft. 6 in.
" " rigid.....	11 ft. 6 in.
" " total.....	26 ft. 3 in.



Cylinders.

Diam. of cylinders.....	20 in.
Stroke of piston.....	28 in.
Horizontal thickness of piston.....	5 1/4 in.
Diam. of piston rod.....	3 1/4 in.
Kind of piston packing.....	Dunbar
Size of steam ports.....	18 in. x 1 1/4 in.
" exhaust ports.....	18 in. x 3 in.
" bridges ports.....	1 1/4 in.

Valves.

Kind of slide valves.....	Richardson balanced
Greatest travel of slide valves.....	5 1/2 in.
Outside lap of slide valves.....	3/4 in.
Inside.....	3/4 in.
Lead of valves in full gear.....	3/4 in.
Kind of valve stem packing.....	U. S. metallo

Wheels, etc.

Diameter of driving wheels outside of tire.....	63 in.
Material.....	Cast iron
Tire held by.....	Shrinkage
Driving-box material.....	Steeled cast iron
Diameter and length of driving journals.....	8 1/4 in. diam. x 11 in.
" main crank pin journals.....	6 in. diam. x 8 in.
" side rod crank pin journals, Main.....	6 1/2 in. diam. x 5 1/4 in. F & B., 4 1/4 in. diam. x 3 1/4 in.
Engine truck, kind.....	Two wheel swing bolster
" journals.....	6 in. diam. x 10 in.
Diameter of engine truck wheels.....	33 in.
Kind of engine truck wheels.....	Krupp No. 3 wheel; tire 3 1/4 in. x 5 1/4 in., held by retaining rings.

Boilers.

Style.....	Extended wagon top
Outside diameter of first ring.....	62 1/2 in.
Working pressure.....	190 lbs.
Material of barrel and outside of firebox.....	Carbon steel

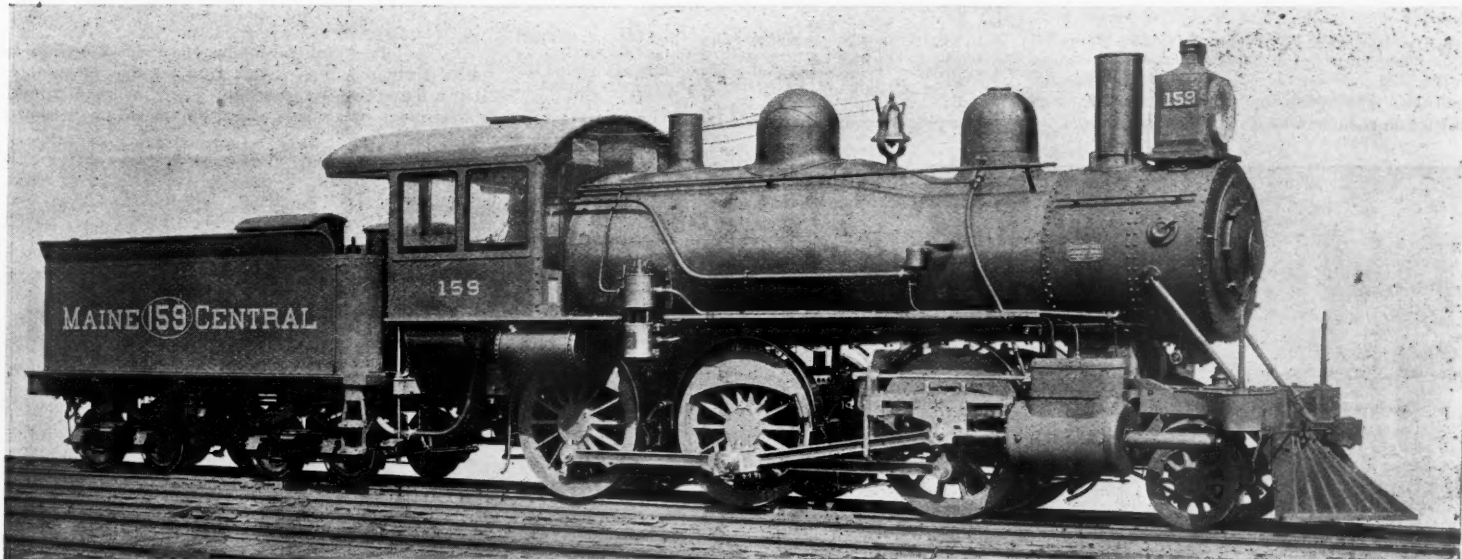
regular "race" to the north as last year, yet some of the work put down for daily practice may interest American students of train speeds. I give, therefore, in the subjoined table a list of all runs on both East and West Coast routes, which, from start to stop, attain or exceed a scheduled timing of 55 miles an hour. The Caledonian work, considering the heavy gradients, is of the highest order, while of the others the run from Wigan to Carlisle, 105 1/4 miles, in 113 minutes, over many miles of grades at 45 ft. to the mile and not a few at 70 ft. to the mile is most remarkable.

From	To	Line of Railway.	Miles.	Sched-uled time.	Speed in miles per hour.
Perth.....	Forfar	Caledonian	32 1/4	32	60.9
Beattock.....	Carlisle	"	39 3/4	42	56.8
Stirling.....	Perth	"	33	35	56.6
Carlisle.....	Stirling	"	117 3/4	125	56.5
Wigan.....	Carlisle	L. & N. W.	105 1/4	112	56.4
Grantham.....	York	G. N.	82 3/4	88	56.4
Rugby.....	Crewe	L. & N. W.	75 1/4	81	56.0
Crewe.....	Wigan	"	36	39	55.4
Peterborough.....	York	G. N.	111 1/4	121	55.4
King's Cross.....	Peterb'gh	"	76 1/4	83	55.1

A trip in actual practice over the northern section of the London & North Western is given below. A speed of just over 60 miles an hour was maintained from Wigan right through to Carlisle. Even with two engines

The Lake Superior Ore Trade.

At the end of last month the iron mines of the Lake Superior region had turned out an aggregate product of a hundred million tons of ore. This nominally extends over fifty years, but up to a time comparatively recent the annual shipments were small. In point of fact 62,000,000 tons out of the whole output have been shipped in the last 10 years. In the development of the ore traffic of the lakes two influences have been at work—the demands of the rapidly growing steel industry and the improvements of the lake channels. The one has stimulated the other, for every foot added to the water over the St. Clair Flats and in the St. Mary's Falls Canal and its approaches has taken something from the cost of freight by adding something to the draft of the ore carrier. In 1865 the number of tons of ore carried on the lakes was only 147,459; by 1875 this had grown to 493,408; by 1885 it was 1,234,132, and last year it was over 9,000,000 tons. This year the Mesaba range, which was only discovered in 1892, set out to lead all the ranges with a product of 4,500,000 tons, but this rate of production is likely to be materially reduced. The present possibility of the Lake Superior ranges, however, well up to 15,000,000 tons, and some idea of the commerce which this is calculated to create in the mere act of transportation to the receiving and distributing port on Lake Erie may be gathered from the fact that the 13 steel ships of the



Mogul Freight Locomotive for the Maine Central Railroad.

Mr. AMOS PILSBURY, Supt. Motive Power.

Built by the SCHENECTADY LOCOMOTIVE WORKS.

Thickness of plates in barrel and outside of firebox.....	3/4 in.
" water space.....	1/2 in., 3/4 in., 1 in. and 1 1/4 in.
Horizontal seams, built joint, sextuple riveted, with welt strips inside and outside.....	
Circumferential seams.....	Double riveted
Firebox, length.....	96 1/2 in.
" width.....	40 1/2 in.
" depth.....	Front, 76 in.; back, 64 in.
" material.....	Carbon steel
" plates, thickness, sides.....	3/4 in.; back, 1/2 in.; crown, 3/4 in.
" tube sheet, 1/2 in.	
" water space.....	front, 4 in.; sides, 3 1/4 in.; back, 4 in.
" crown staying.....	Radial stays, 1 in. diam.
" staybolts.....	Taylor iron, 3/4 in. and 1 in.
Tubes, material.....	Charcoal iron, No. 12 in W. G.
" number of.....	320
" diameter.....	2 in.
" length over tube sheets.....	12 ft. 0 in.
Fire brick, supported on.....	Water tubes
Heating surface, tubes.....	1,906.24 sq. ft.
" water tubes.....	20.51 sq. ft.
" firebox.....	155.03 sq. ft.
" total.....	2,172.18 sq. ft.
Grate surface.....	26.96 sq. ft.
Grate style.....	Rocking, with dump plate
Ashpan style.....	Sectional, hopper with dump plates
Exhaust pipes.....	Single
Exhaust nozzles.....	4 1/2 in., 5 1/4 in., 5 1/2 in. diam.
Smokestack, inside diameter.....	16 in. at top, 14 1/2 in. near bottom.

Smokestack, top above rail.....	14 ft. 4 1/4 in.
Boiler supplied by.....	Two Hancock Inspirators, Type D. No. 9

Tender.

Weight, empty.....	37,800 lbs.
Wheels, number of.....	8
" diameter.....	33 in.
Journals, diameter and length.....	4 1/4 in. diam. x 8 in.
Wheel base.....	14 ft. 6 in.
Tender frame.....	6 1/4 in. x 4 in. x 3/4 in. angle iron
Trucks.....	4-wheel, channel iron, Maine Central style
Water capacity.....	4,000 U. S. gallons
Coal.....	8 (2,000-lb.) tons
Total wheel base of engine and tender.....	47 ft. 7 1/4 in.
Total length of engine and tender.....	56 ft. 5 1/2 in.
Engine fitted with—	
" Westinghouse-American Brake on all drivers, tender and for train.	
" Westinghouse 9/4-in. air pump.	
" Two 3-in. Ashton safety valves, 1 muffled and 1 open pop.	
" Asbestos cement boiler lagging.	
" Trojan coupler on pilot and rear of tender.	
" National Hollow Brake Beams, with Lappin flanged shoes.	
" No. 3 Crosby 6-in. chime whistle.	

The Fast Trains Between London and Scotland.

(Second Article.)

BY J. PEARSON PATTINSON.

In my former short notice, appearing in your issue of July 17, I gave in tabular form the services from London to the principal centers of competition in Scotland, viz., Edinburgh, Glasgow, Perth and Aberdeen. It is now possible, after an examination of the working time-tables of the various companies to give more detailed particulars, and although there is no probability of a

and a comparatively light train the work over such gradients deserves to be permanently recorded.

The line rises from Wigan for 6 miles on grades varying from 1 in 120 to 1 in 330 and drops 10 miles (nearly) at almost similar rates. Rising thence for 4 miles easily at about 1 in 500, it undulates 16 miles and then drops a mile at 1 in 90 into Lancaster. To Carnforth an easy descent succeeds, followed by 2 1/2 miles, rising at 1 in 131 and 3 miles almost level. This brings us to Milnthorpe, at the foot of the long and severe Grayrigg Bank, rising 13 miles, averaging about 1 in 133, but in parts as severe as 1 in 105. A slight descent and level bring us to Tebay, after which the severe Shap incline (2 miles of 1 in 147 and 4 miles of 1 in 75 rising) is encountered. The descent from the summit (the highest point of the North Western main line) to Carlisle is almost unbroken and nearly all the way fairly steep (1 in 125 for long stretches). The route throughout is a most severe one.

WIGAN TO CARLISLE (105 1/4 miles in 104 min.)

(Schedule time, 112 min.)

London & North Western Railway.

Stations.	Distance apart. Miles & chains.	Actual time. Hours, min., sec.	
Wigan.....		a. m. 12: 8.43	Engines "Baltic" 6 ft. 6 in. coupled, cylinders "Vimiera" 17 by 24.
Standish.....	3-24	12:14.03	Load:—About 145 tons (excluding locomotives).
Coppull.....	2-31	12:17.13	Slowed down through Preston station.
Farington.....	7-10	12:23.00	
Preston.....	2-25	12:25.15	
Barton and Broughton.....	4-61	12:31.10	
Scorton.....	7-75	12:37.55	
Galgate.....	3-76	12:41.15	
Lancaster.....	4-27	12:44.48	
Hest Bank.....	3-60	12:47.14	
Carnforth.....	3-14	12:49.54	
Oxenholme.....	12-64	1:03.02	
Grayrigg.....	7-19	1:11.58	
Low Gill.....	1-47	1:13.30	
Tebay.....	4-20	1:17.46	
Shap Summit.....	5-40	1:24.55	
Shap Station.....	2-10	1:27.05	
Clifton.....	7-22	1:32.58	
Penrith.....	4-17	1:36.30	
Plumpton.....	4-75	1:40.40	
Calthwaite.....	2-24	1:42.35	
Southwaite.....	3-20	1:45.09	Highest speed on journey reached between these stations, viz., 79 miles an hour.
Wray.....	2-25	1:46.58	Quite a minute was lost two miles from Carlisle; signals against train.
Carlisle.....	4-77	1: 2.45	

An Air-Brake Instruction Car.

We have received from Mr. William Garstang, Superintendent of Motive Power of the Cleveland, Cincinnati, Chicago & St. Louis Railway, photographs and a description of an air-brake instruction car recently got up by his company. Externally this car is of the standard style and color of the "Big Four" system. It is 54 ft. long inside, is finished in ash and walnut and divided into two compartments. One of these is a reception room and office containing desk, chairs, one lower and one upper berth, the lower being of the portable lounge pattern, also wardrobe, toilet and carpet.

The other compartment, the lecture room, contains the Westinghouse and American air-brake and signal appliances, constituting the total equipment of two locomotives (one 8-wheeler and one 10-wheeler); the driver-brake models made to operate in conjunction with the other appliances and wheel revolved by a small motor, representing a double-header; one passenger and six freight-car equipments, which are placed on the wall in such a position that each equipment is entirely separated by windows affording plenty of light and ventilation, thereby permitting all pipe fittings, hose and hose cocks to be in regular position the same as upon a train of the same length, the full brake-pipe volume being stored away. Directly above each appliance is a large photograph indicating the design of vehicle the appliance is for. The 8-in. pump which supplies the air is at the opposite end of the car from the locomotive appliances that it may be near the boiler, which, and the duplex-boiler



feed pump, are placed one above the other over a drip pan.

All the valves, cut in section, are mounted on pedestals and placed on a strongly built table, and painted red.

The upright boiler and coal bunker is partitioned off with folding doors, preventing heat and dirt from entering the lecture room, and at the same time giving easy access to the boiler for cleaning and repairing.

Cut in section are a 9½-in. air pump mounted on a revolving pedestal, an entire freight-car brake and a Nathan No. 9 injector and triple sight-feed lubricator. There is also a working model of the latest improved Leach rail sanding device.

In a large case are six blackboards, each containing working diagrams of all the air valves, pump valve motion, brake foundation gears, templates, diagrams, etc., which are used in the elementary lessons and referred to in explaining mechanical effects.

The car is equipped with Pintsch gas fixtures having four four-flame lamps in the body of the car, and two side bracket lamps, one over the instructor's desk in the office room and the other in front of the steam gauge at the boiler. The lamps are supplied by two gas receivers. In addition to the receivers there is a water tank. The receivers and water tank are placed beneath the car so as to balance the weight of machinery on the opposite side, making an equal distribution of weight on all springs of the car.

The car is heated by the Gold system of steam heat, supplied with the standard valves, gages and traps, but so arranged as to return the condensed steam to its own water tank. The car's steam heat, signal and foundation brake gear appliances are connected with those in the instruction room and used in this connection.

tween them. The specimen, if of satisfactory strength when cast under the same circumstances as those which attend the casting of the full-sized piece, must carry at least the minimum weight named above, and exhibit when broken the fracture of gray iron of good quality. Failure shall be produced in not less than two minutes nor more than five minutes from application of the first load, and the bar must show a center deflection before breaking of at least ⅛ in., and must indicate a good quality of gray iron.

**Wrought Iron.**—The committee recommends that the expression "elastic limit" be confined in its use to its original meaning, since its more general adoption leads to ambiguity and to useless discussion and dissension. The usual methods of testing indicate the first strength or "yield point" of the material, and in order to avoid the objections already mentioned, the committee has confined itself to the expression "yield point" when applied to practical testing. The "drop of beam" is considered sufficiently accurate to determine the "yield point," but the increased accuracy of autographic records or use of instruments of precision is recommended.

Experimental investigations show that the relative dimensions of a test piece become of little practical consequence if the gaged length exceeds about four times the greatest diameter of the specimen. It is, therefore, recommended that a minimum gaged length of 8 in. be used for the general practice of testing specimens, with a distance of not less than 12 in. between shoulders of the specimen, or between the jaws of the testing machine. Under these conditions, however, it is understood that the gaged length shall in no case be less than four times the greatest diameter of the test piece, and that the minimum thickness shall be ¼ in.; also that the sectional area of test piece shall not be less than ⅜ sq. in. In obtaining the final elongation, the curves of reduction each side of the point of fracture should be included in the measured length.

In testing it is recommended that the load be applied continuously and at a rate as nearly as practicable of 4,000 to 5,000 lbs. per square inch per minute below the yield point, and of 7,000 to 8,000 lbs. above the yield point.

It is recommended that the ordinary bending test be

grade of steel, and that the ultimate resistance of the test specimen should not vary more than 4,000 lbs. per square inch either way from the resistance specified. It is also recommended that the yield point, the elongation and the reduction of area each be a function of the ultimate strength found in the test specimen.

The following requirements are recommended for the various grades of steel:

Ultimate Strength per Square Inch.	
Low steel.....	60,000 lbs. ± 4,000
Medium steel.....	65,000 " ± 4,000
High steel.....	70,000 " ± 4,000
Yield point = 55% of the ultimate resistance of specimen.	
Per cent. elongation in 8 in. =	1,500,000
	Ultimate
	2,800,000
Per cent. reduction of area =	Ultimate

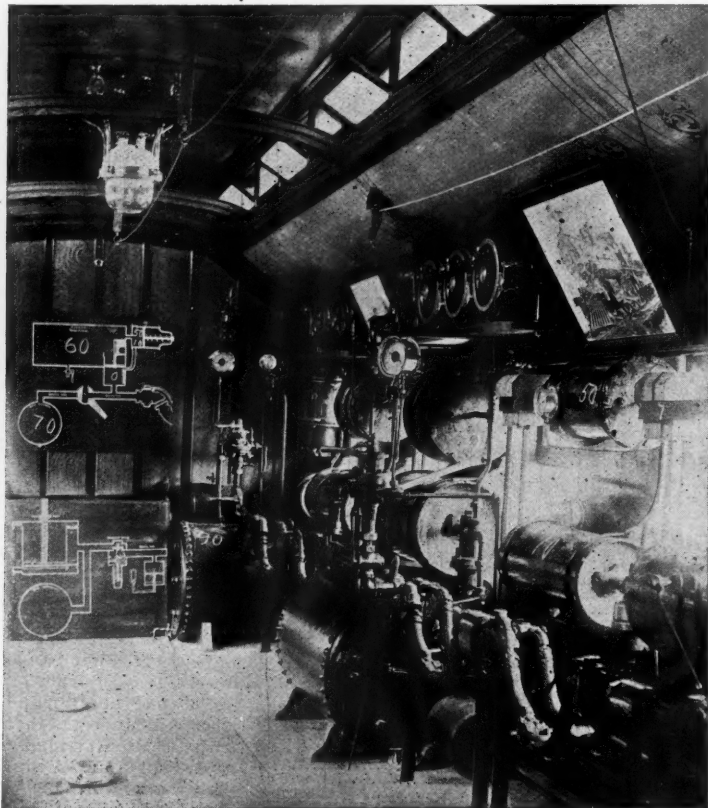
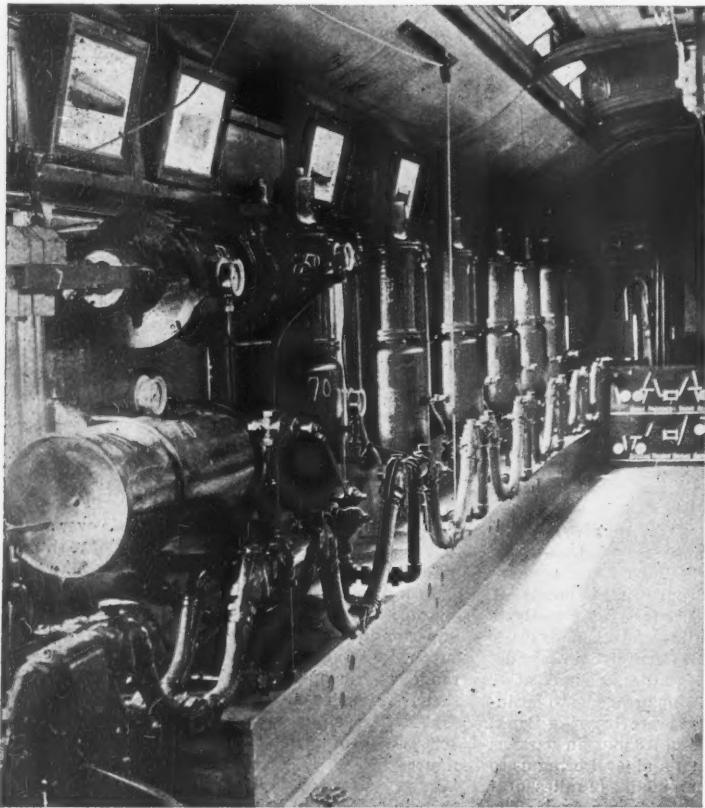
Rivet steel when heated to a low cherry red and quenched in water at 82 deg. Fahr. must bend to close contact without sign of fracture. Specimens of low steel when treated and tested in the same manner must stand bending 180 deg. to a curve, whose inner radius is equal to the thickness of the specimen without sign of fracture. Specimens of medium steel, as cut from bars or plates and without quenching must stand bending 180 deg. to an inner radius of one and one-half times the thickness of the specimen without sign of fracture; while those of high steel, also without quenching, must stand bending 180 deg. to a radius of twice the thickness of the specimen without sign of fracture.

**Steel Castings.**—In steel castings the tension test is recommended, with the following requirements:

Ultimate.....	65,000 lbs. per square inch.
Yield point.....	35,000 " "
Elongation in 8 in. = 15%	
Contraction = 25%	

#### Train Speed Table.

The subjoined table for finding the speed of a train in miles per hour will often be found handy. It assumes that the posts are a mile apart. One may readily note the number of seconds taken by the train in running



Air Brake Instruction Car—C., C. & St. L. Ry.

The plan of operating the car is to have it go from one division point to another where previous notice is given, and those whose duties in any way bring them in contact with such appliances are requested to attend the lectures as often as possible during its stay.

In the design of this car the aim has been not only to have the apparatus of instruction completely and conveniently shown, but also to make the car comfortable for those giving and for those receiving instructions. Attention, therefore, has been paid to light, ventilation and seating capacity, and those in attendance are not obliged, as is frequently the case in cars of this sort, to stand crowded together during the lecture and to endure the heat of the boiler as well as the inconvenience of standing. The car is now in service on the Chicago Division in charge of the company's inspector and instructor, Mr. W. J. Hartman.

#### Uniform Methods of Testing Materials.

At the last annual meeting of the Am. Soc. C. E., held in New York last January, the Committee on Uniform Methods of Testing Materials, etc., was discharged from further considerations of the subject. The committee consisted of Messrs. James G. Dugan, Robert W. Hunt, Henry B. Seaman and William H. Burr. Mr. Seaman (40 Wall street) has reprinted, in convenient form, the following abstract of the final report of this committee, which he will send to anyone who wishes it:

**Cast Iron.**—We recommend the transverse tests of a specimen 2 × 1 in. in section and 27 in. long, resting flatwise on dull knife-edge supports 24 in. apart, centers, with an applied weight of 2,000 lbs. or more, midway be-

continued, and that it be made rapidly with pressure, rather than with blows of a hammer, as the results are thereby more comparable. The nicked bending or fracture test, however, does not show any essential property of the material which would not be disclosed by the tests already mentioned, and hence its adoption is not recommended.

For the requirements of wrought iron with the tests outlined, the following are recommended:

	Bars per square inch.	Tension plate, angle and other shapes.	Compression plate, angle and other shapes.	Web plates
Yield point..	26,000	26,000	26,000	26,000
Ultimate.....	50,000	48,000	48,000	46,000
Elongation in 8 in. =	20%	15%	12%	8%
Reduction....	30%	20%	16%	12%

Specimens should bend cold 90° without fracture, with inner radius of bending not exceeding twice the thickness of the test piece for bar iron, nor three times that thickness for plate and shape iron.

Rivet iron must be soft and tough, and pieces of the full diameter of the rivet must be capable of bending cold until their sides are in close contact without showing signs of fracture.

**Rolled Steel.**—The methods of testing wrought iron may, in general, be applied to rolled steel. In addition to these, however, the quenching test may be used to advantage, by which a specimen heated to cherry red is to be quenched in water of 82° Fahr., and then tested as usual.

The drifting test is not recommended as a requirement for quality, and the annealing test is recommended only for full-size eye cars.

For the requirements of rolled steel, it is recommended that a mean ultimate resistance be specified for each

from one mile post to another; then look into the table for the number of seconds approximately or exactly equal to the number of seconds noted. The rate to the nearest even mile is found in miles per hour. A similar table was printed by us five years ago.

Miles per hour.	M. S.	Miles per hour.	M. S.	Miles per hour.	Sec.	Miles per hour.	Sec.
1.....	60 00	31.....	1 56	61.....	59.0	91.....	39.6
2.....	30 00	32.....	1 52	62.....	58.1	92.....	39.1
3.....	20 00	33.....	1 49	63.....	57.1	93.....	38.7
4.....	15 00	34.....	1 46	64.....	56.2	94.....	38.3
5.....	12 00	35.....	1 43	65.....	55.4	95.....	37.9
6.....	10 00	36.....	1 40	66.....	54.5	96.....	37.5
7.....	8 34	37.....	1 37	67.....	53.7	97.....	37.1
8.....	7 30	38.....	1 35	68.....	52.9	98.....	36.7
9.....	6 40	39.....	1 32	69.....	52.2	99.....	36.4
10.....	6 00	40.....	1 30	70.....	51.4	100.....	36.0
11.....	5 27	41.....	1 28	71.....	50.7	101.....	35.6
12.....	5 00	42.....	1 26	72.....	50.0	102.....	35.3
13.....	4 37	43.....	1 24	73.....	49.3	103.....	34.9
14.....	4 17	44.....	1 22	74.....	48.7	104.....	34.6
15.....	4 00	45.....	1 20	75.....	48.0	105.....	34.3
16.....	3 45	46.....	1 18	76.....	47.4	106.....	33.9
17.....	3 32	47.....	1 16	77.....	46.7	107.....	33.6
18.....	3 20	48.....	1 15	78.....	46.2	108.....	33.2
19.....	3 09	49.....	1 13	79.....	45.5	109.....	33.0
20.....	3 00	50.....	1 12	80.....	45.0	110.....	32.7
21.....	2 51	51.....	1 10	81.....	44.4	111.....	32.4
22.....	2 44	52.....	1 09	82.....	43.9	112.....	32.1
23.....	2 36	53.....	1 08	83.....	43.2	113.....	31.9
24.....	2 30	54.....	1 06	84.....	42.9	114.....	31.6
25.....	2 24	55.....	1 05	85.....	42.4	115.....	31.3
26.....	2 18	56.....	1 04	86.....	41.9	116.....	31.0
27.....	2 13	57.....	1 03	87.....	41.4	117.....	30.8
28.....	2 08	58.....	1 02	88.....	40.9	118.....	30.5
29.....	2 04	59.....	1 01	89.....	40.4	119.....	30.3
30.....	2 00	60.....	1 00	90.....	40.0	120.....	30.0

#### Foreign Railroad Notes.

At a recent meeting of the Prussian National Railroad Council, which gives it advice on such matters, there was presented a proposal to make a special low rate on a





Air Brake Instruction Car—Cleveland, Cincinnati, Chicago & St. Louis Railway.

bride's "setting-out," when consisting of articles taken from the household of the parents or others giving it. The proposal was rejected, but apparently only because of the difficulty of determining whether the articles actually come from an already established household.

The German Railroad Union has awarded the prizes announced in 1894, as follows: one of 7,500 marks (\$1,800) to A. Klose, of Stuttgart, for his improved system of radial locomotives.

Two of 3,000 marks (\$720), one to a Berlin company for railroad track appliances for an improved rail-joint, and one to Krauss & Co., of Munich, for their locomotive truck.

Ten of 1,500 marks (\$330); one to A. Prash, of Vienna, for a novel optical control of signals; one to F. Gattinger, of Vienna, for apparatus for protection against storms; one to Chief Inspector Leschinsky, of Breslau, for an automatic apparatus providing against misplacing switches; one to Locomotive Superintendent Belcsak, of Vienna, for a car door; one to F. Maiss, of Berlin, for improvements in locomotive whistles; and five for railroad books, namely: Kemmann's "London Traffic," Rank's "Railroad Rates in their Relation to Economics and Administration," Von Borries' and Bute's "North American Railroads from a Technical Standpoint," Dr. Roll's monumental "Railroad Encyclopædia," and Dr. Gerstner's "International Railroad Freight Law." Of all these books but the last, some account has been given heretofore in the *Railroad Gazette*.

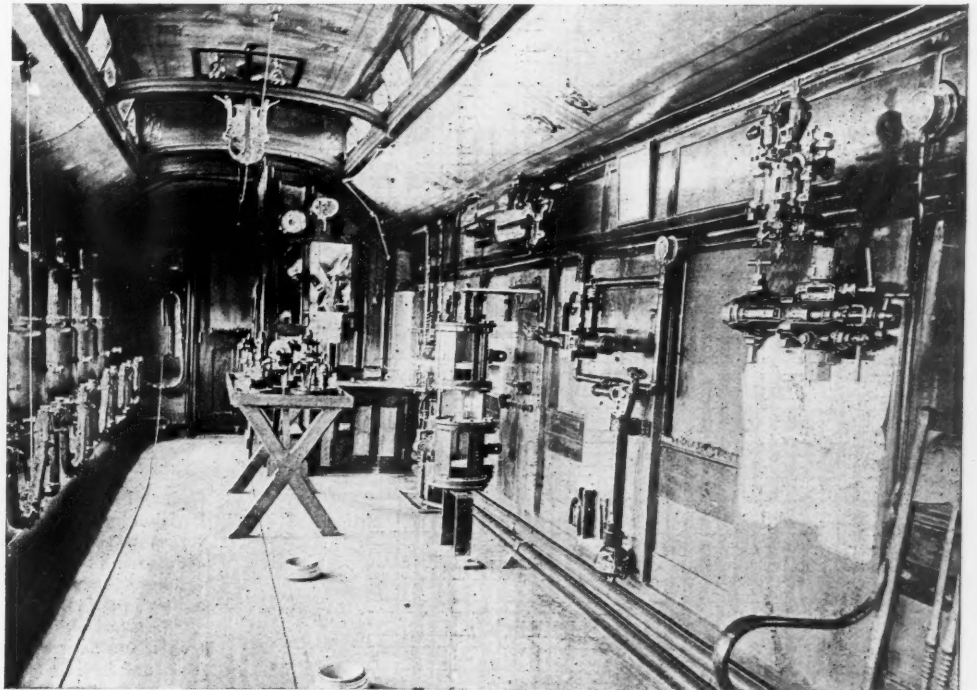
The Austrian State Railroad authorities are considering how they can increase the speed of their express trains from 37 to 50 miles an hour. It is possible that some trains on principal routes will run at the latter speed this summer.

The Hungarian criminal code provides that railroad employees by whose fault passengers or goods have been exposed to the risk of injury shall be dismissed from the service. A regulation provides that no employee so discharged shall be re-engaged for the same service without the special permission of the Minister of Commerce. The Hungarian Minister has notified the railroad managements that in case they wish to re-employ such men they must give him a detailed report showing why his employment is not likely to be dangerous again.

The Russian railroads in 1895 carried 4,341,887 passengers (1½ per cent. more than in 1894) and 82,087,748 tons of freight (3 per cent. more than in 1894). The number of carloads of some of the chief freights (the full car-

load is now about 25,000 lbs.) were: Grain, 600,447; coal 512,017; petroleum and products, 138,990.

The International Sleeping Car Company, which is the European Pullman—but with a great interval—earned from all sources last year just about \$1,400,000, which was nearly one-sixth more than the year before. More



Air Brake Instruction Car.

than half of these earnings (\$715,000) were net, and this was one-fourth more than in 1894. After meeting all fixed charges and payments of \$244,000 to sinking funds, there remained a profit of \$213,000 (against \$129,000 in 1894). The shareholders received 6 per cent. on their stock.

By the building of the last section of railroad between

Naples and Reggio the line along the west coast of Italy has been completed. The construction has been costly, there being nearly a hundred bridges of some length and 82 tunnels; two of them three miles long, two two miles and 15 more of over half a mile. Just below Scylla the cars are ferried across the Faro to Messina, where they connect with the Sicilian roads.

Russian peasants are emigrating to Siberia in numbers that alarm the Government. The part of the Siberian railroad opened has been blocked by the rush, 13,000 persons being encamped at Tchelyabursk in the middle of May waiting for transportation. So far this year 145,000 have emigrated, whole villages being left without inhabitants.

The Hungarian state railroads carried 4 per cent. more passengers in 1895 than in 1894, and earned 1.6 per cent. more from passenger traffic. The average receipt per passenger journey was 28 cents.

#### The "H. W. J." Electric Car Heater.

We have illustrated and described from time to time in the *Railroad Gazette* several electric car heaters as they have been put upon the market. Much trouble



Fig. 1.—The "H. W. J." Electric Car Heater.

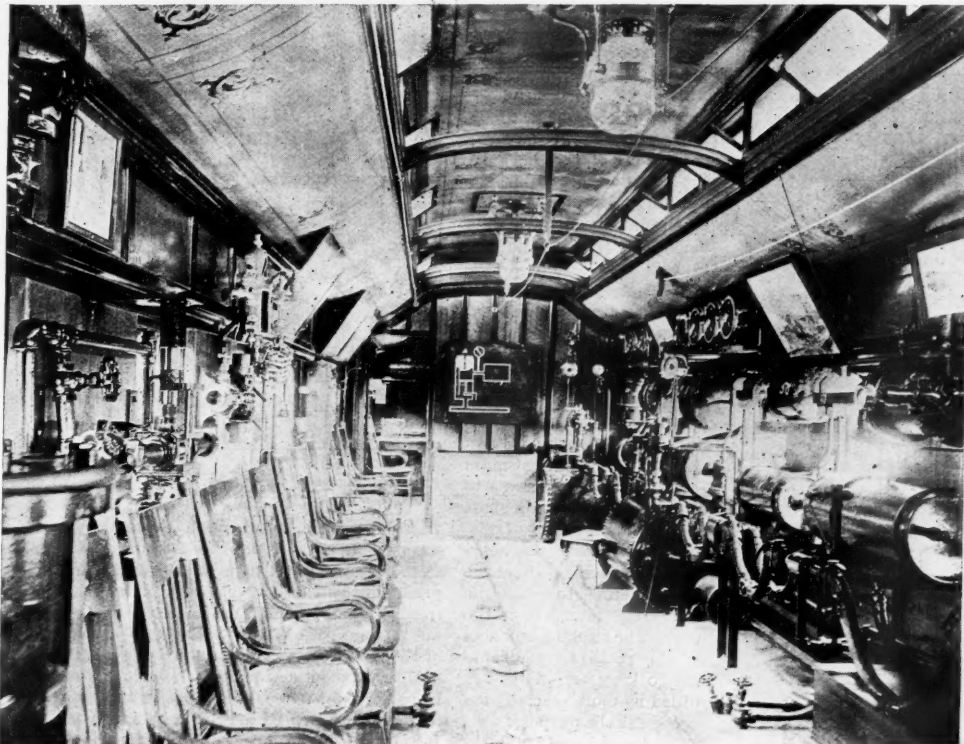
attached to their insulating supports. To accomplish the latter purpose the Gold Car Heating Company placed the wires in slight grooves in asbestos boards.



Fig. 2.—Regulating Switch.

In the heater made by the H. W. Johns Manufacturing Company, the resistance wires after being wound with asbestos cord are woven into a mat with an asbestos warp. In this manner the wires are effectually insulated from each other and the liability of short circuits practically obviated. The mat thus prepared is attached to a backing of asbestos millboard and confined in an ornamental perforated steel casting. It has been the special aim of the company in making this heater to prevent the liability of "burn-outs" and give a very large heating surface. The heaters are attached to the faces of the panels beneath the seats at intervals along the sides of the car.

As will be seen by the engraving of the regulating switch, the handle may be turned to the notches that are there represented, so that three degrees of temperature may be obtained which are represented by the consumption of about three, six and nine amperes.



Air Brake Instruction Car,



Interlocking at Hartford.

The New York, New Haven & Hartford has just completed the erection of a new interlocking machine of 64 levers at Hartford, Conn., the location being just east of the tunnel, where the two main tracks of the New England Railroad cross the two main tracks of the New York, New Haven & Hart-

ford Division, was carried out without interruption of trains and without the aid of hand signals; that is to say, the signals operated from the old tower were kept in service in each case until the new signal was ready, so that no train passed except under a semaphore signal, although new double-slip switches were put in at the same time.

The old machine was one of those operated by means of a crank and horizontal screw, which in the rapid progress of signaling have now come to be regarded as an ancient curiosity.

The Jacques Carbon Battery.

The results of three series of experiments made by Chas. J. Reed, of Philadelphia, which were recently published, seem to indicate that the electric energy derived from the Jacques battery is produced by thermo-electric junction instead of being evolved directly from the carbon. In other words, the elec-

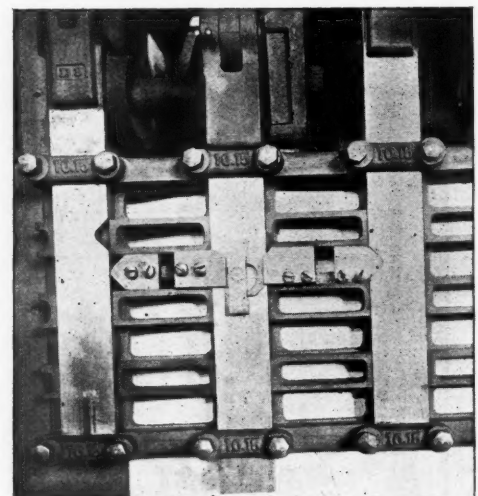


Fig. 6.—Device for Special Locking.

tricity is generated through the agency of heat and not by a chemical action, as Dr. Jacques' experiments seem to indicate. The apparatus in the first series of experiments consisted of a sheet-iron cup having a long iron handle to which was soldered a wire, connected to one terminal of a Weston voltmeter. The other terminal of the voltmeter was connected by a flexible wire successively to conducting rods of carbon, nickel, copper, iron, German silver, lead and cadmium, which were inserted into the fused soda at frequent intervals. Readings were taken every minute from the time the alkali fused to the time it attained the highest temperature, also from the highest temperature

LOCKING SHEET			
LEVER	LOCKS	LEVER	LOCKS
1	(5)	34	(3)
2	(7)-(8)-(9)	35	
3	(7)-(8)-(9)-(10)-(11)-(12)-(13)-(14)-(15)-(16)-(17)-(18)-(19)-(20)-(21)-(22)-(23)-(24)-(25)-(26)-(27)-(28)-(29)-(30)-(31)-(32)-(33)-(34)-(35)-(36)-(37)-(38)-(39)-(40)-(41)-(42)-(43)-(44)-(45)-(46)-(47)-(48)-(49)-(50)-(51)-(52)-(53)-(54)-(55)-(56)-(57)-(58)-(59)-(60)-(61)-(62)-(63)-(64)	36	
4	(7)-(8)-(9)-(10)-(11)-(12)-(13)-(14)-(15)-(16)-(17)-(18)-(19)-(20)-(21)-(22)-(23)-(24)-(25)-(26)-(27)-(28)-(29)-(30)-(31)-(32)-(33)-(34)-(35)-(36)-(37)-(38)-(39)-(40)-(41)-(42)-(43)-(44)-(45)-(46)-(47)-(48)-(49)-(50)-(51)-(52)-(53)-(54)-(55)-(56)-(57)-(58)-(59)-(60)-(61)-(62)-(63)-(64)	37	38
5	(7)-(8)-(9)-(10)-(11)-(12)-(13)-(14)-(15)-(16)-(17)-(18)-(19)-(20)-(21)-(22)-(23)-(24)-(25)-(26)-(27)-(28)-(29)-(30)-(31)-(32)-(33)-(34)-(35)-(36)-(37)-(38)-(39)-(40)-(41)-(42)-(43)-(44)-(45)-(46)-(47)-(48)-(49)-(50)-(51)-(52)-(53)-(54)-(55)-(56)-(57)-(58)-(59)-(60)-(61)-(62)-(63)-(64)	38	(2)
6	(7)-(8)-(9)-(10)-(11)-(12)-(13)-(14)-(15)-(16)-(17)-(18)-(19)-(20)-(21)-(22)-(23)-(24)-(25)-(26)-(27)-(28)-(29)-(30)-(31)-(32)-(33)-(34)-(35)-(36)-(37)-(38)-(39)-(40)-(41)-(42)-(43)-(44)-(45)-(46)-(47)-(48)-(49)-(50)-(51)-(52)-(53)-(54)-(55)-(56)-(57)-(58)-(59)-(60)-(61)-(62)-(63)-(64)	39	(33)-(34)-(35)-(36)-(37)-(38)-(39)-(40)
7	(7)-(8)-(9)-(10)-(11)-(12)-(13)-(14)-(15)-(16)-(17)-(18)-(19)-(20)-(21)-(22)-(23)-(24)-(25)-(26)-(27)-(28)-(29)-(30)-(31)-(32)-(33)-(34)-(35)-(36)-(37)-(38)-(39)-(40)-(41)-(42)-(43)-(44)-(45)-(46)-(47)-(48)-(49)-(50)-(51)-(52)-(53)-(54)-(55)-(56)-(57)-(58)-(59)-(60)-(61)-(62)-(63)-(64)	40	(33)-(34)-(35)-(36)-(37)-(38)-(39)-(40)
8	(7)-(8)-(9)-(10)-(11)-(12)-(13)-(14)-(15)-(16)-(17)-(18)-(19)-(20)-(21)-(22)-(23)-(24)-(25)-(26)-(27)-(28)-(29)-(30)-(31)-(32)-(33)-(34)-(35)-(36)-(37)-(38)-(39)-(40)-(41)-(42)-(43)-(44)-(45)-(46)-(47)-(48)-(49)-(50)-(51)-(52)-(53)-(54)-(55)-(56)-(57)-(58)-(59)-(60)-(61)-(62)-(63)-(64)	41	(37)-(38)-(39)-(40)-(41)-(42)-(43)-(44)
9	(7)-(8)-(9)-(10)-(11)-(12)-(13)-(14)-(15)-(16)-(17)-(18)-(19)-(20)-(21)-(22)-(23)-(24)-(25)-(26)-(27)-(28)-(29)-(30)-(31)-(32)-(33)-(34)-(35)-(36)-(37)-(38)-(39)-(40)-(41)-(42)-(43)-(44)-(45)-(46)-(47)-(48)-(49)-(50)-(51)-(52)-(53)-(54)-(55)-(56)-(57)-(58)-(59)-(60)-(61)-(62)-(63)-(64)	42	(36)-(37)-(38)-(39)-(40)-(41)-(42)-(43)
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11	(7)-(8)-(9)-(10)-(11)-(12)-(13)-(14)-(15)-(16)-(17)-(18)-(19)-(20)-(21)-(22)-(23)-(24)-(25)-(26)-(27)-(28)-(29)-(30)-(31)-(32)-(33)-(34)-(35)-(36)-(37)-(38)-(39)-(40)-(41)-(42)-(43)-(44)-(45)-(46)-(47)-(48)-(49)-(50)-(51)-(52)-(53)-(54)-(55)-(56)-(57)-(58)-(59)-(60)-(61)-(62)-(63)-(64)	44	
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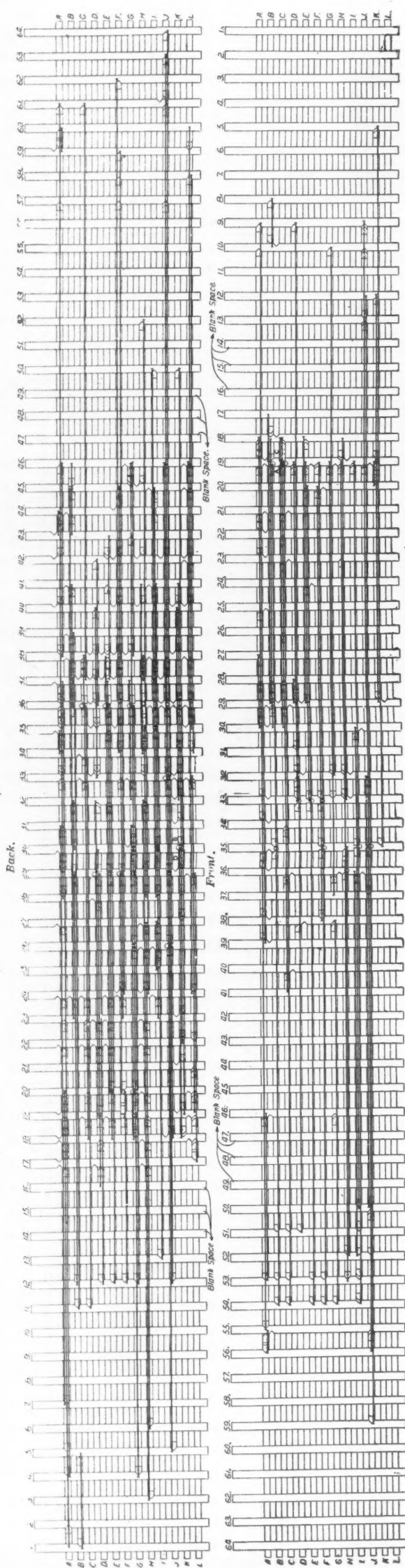
Fig. 2.—Locking Sheet—Hartford Interlocking.

Fig. 3.—Dog Sheet, Hartford Interlocking.  
The National Switch and Signal Co., Makers of Machine.

ford, and where the Valley Division of the latter diverges to the south. There are also a number of side-tracks at this point, making a busy junction.

This interlocking machine was manufactured by the National Switch & Signal Co., of Easton, Pa., and is the company's '96 model, being the first one built of that pattern. A perspective view of the machine is shown in fig. 4, and one of a single lever in fig. 5. Fig. 2 shows the locking sheet, and Fig. 3 the dog sheet, which give an idea of the combinations necessary between the several levers in order to insure safety to all movements. It will be observed that the dog sheet is divided into two equal parts, this being one of the advantages of the multiple machine of the National Company. The upper half of the dog sheet shows the locking on the back of the machine, which is the normal position of locking in simple plants. In this machine both front and rear tappets are balanced, the combinations of locking reduced to a more simple form and the actuation of the locking made more easy.

The details of this machine have been designed with much care. The faces of the hubs of the lever shoes and the spacers on the main shaft are machined so as to fit closely. The main shaft has been increased in diameter and the frames are heavier than before. There are positive stops to determine accurately the stroke of the lever. The rubbing surfaces of the rockers, quadrants and locking bar plates are milled by tools specially designed for the purpose. The device for special locking shown in Fig. 6 is now a mitered block instead of





until it was cooled to the point of solidification. In each case there was a change from positive to negative electricity a little below the red heat of the metal, and the rate of change of the electromotive force about this time

**Fire-Retarding Qualities of Wired Glass.**  
Some engineers have recently given their attention to the subject of the fire-retarding qualities of wired glass. A series of tests made by William McDevitt and Charles

the same thickness. The tests were made as severe as possible, the glasses being raised to a red heat, at which time cold water was thrown upon them. The conclusions to be drawn from the tests appeared to be as follows: First, wired glass can safely be used in skylights, and in such situations will withstand a severe fire and will not give way when water is thrown upon it. Second, wired glass in wooden sash covered with tin can safely be used for windows toward an external exposure. Third, wired glass can safely be used in fire doors to elevator shafts and stairway towers, where it is necessary to light the shaft.

**The Steel Industry in Great Britain.**

An article in a recent issue of the *American Manufacturer* treats of the Bessemer and open-hearth steel production in Great Britain. A table, giving the total output of Bessemer steel for the last four years shows, as was recently stated in the *Railroad Gazette*, that England has lately been practically standing still in that production, the total output, 1,535,225 tons, in 1895 being

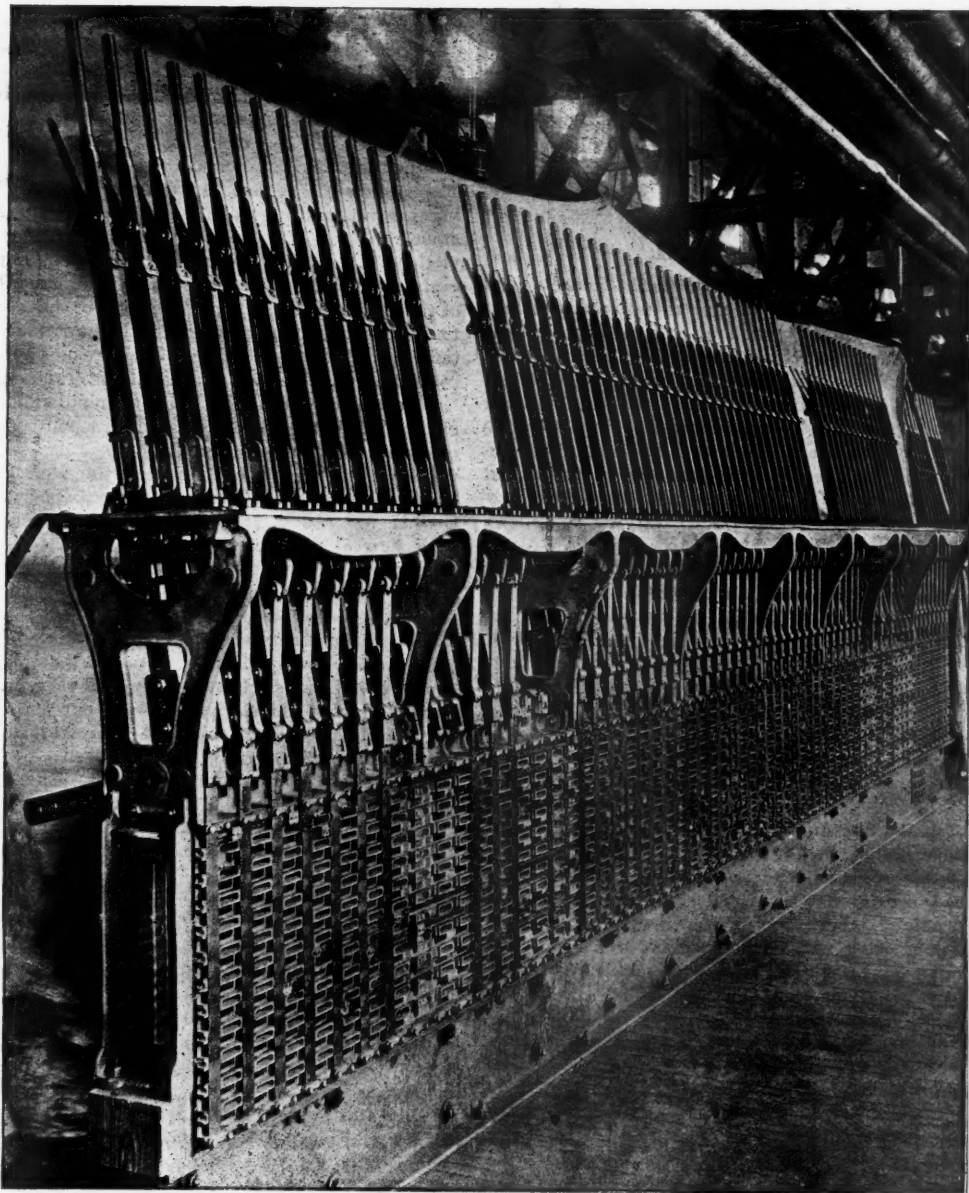


Fig. 4.—Sixty-four-Lever Interlocking Machine.

Made by THE NATIONAL SWITCH AND SIGNAL CO., Easton, Pa.



Fig 5.—Lever and Connections of the National "96 Model" Interlocking Machine.

was very rapid, the greatest electromotive force being when the rods were cold. Mr. Reed said that this is in accordance with the thermo-electric behavior of all substances, but cannot be reconciled to any rational theory of galvanic or chemical action. A careful examination of the arc light carbon rod made before and after the experiment did not show the slightest indication of a change such as would be produced by combustion. The results of the experiments with the iron rod indicate

A. Hexamer, C. E., of Philadelphia, were recently given in a report made to the committee of the Philadelphia Underwriters' Association, from which the following abstract has been made: A brick test house, about 3 x 4 ft. inside measurement and 9 ft. high, was built, in one side of which a wired glass window was fastened in a wooden frame covered with lock-jointed tin. In another side a standard fire door was hung. The upper part of this door

an increase of only 34,415 tons over that in 1892. England made 604,338 tons of rails in 1895, as against 598,580 tons in the previous year, and 579,386 in 1893. In 1889 the total production reached 943,046 tons. The production of finished steel, including rails, was 1,284,765 tons in 1895 and 1,339,824 tons in 1894.

A decided increase is shown in the production of open-hearth steel, the total output of steel ingots being 1,724,737 tons in 1895, as against 1,575,318 tons in 1894. The

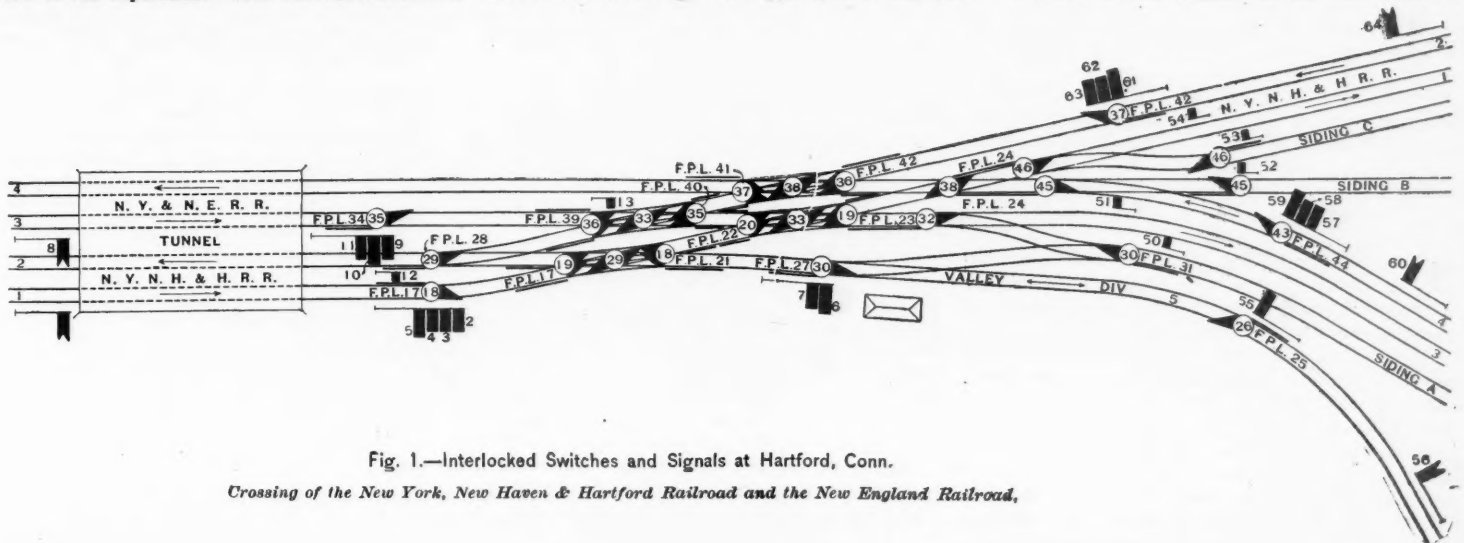


Fig. 1.—Interlocked Switches and Signals at Hartford, Conn.

Crossing of the New York, New Haven & Hartford Railroad and the New England Railroad,

that the rod and cup, both of iron, do not constitute the elements of the thermo-electric junction, but Mr. Reed gives a reasonable theory for this exception. The two other series of experiments made under slightly different conditions confirmed the results which were obtained by the first series.

had a pane of wired glass, 18 x 24 in., set into a wooden metal-covered frame. The entire roof of the test house was replaced by a skylight, the sash being constructed of wood, metal covered; one side of this skylight being provided with three lights of 1/4-in. ordinary rough glass, the other side with three lights of wired glass of

Cleveland district, on the northeast coast, leads, with Scotland second, and by far the greater part of the total output comes from these two districts. There are 324 acid and 42 basic open-hearth furnaces in Great Britain, of which number 204 1/2 acid and 29 basic furnaces were employed during 1895.





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#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The twenty-four o'clock notation, if we may call it so, now prevails in Italy, so far as government regulations apply. That is, the children go to school at 9, as with us, but they are dismissed at 13, 15 or 16 as the case may be. The courts open at 10 and close at 17; Parliament assembles at 13 and adjourns—sometimes not till 24, or later. The government theaters announce that the curtains will rise at 21 o'clock (rarely earlier); and a. m. and p. m. are no longer known on railroad time tables. How far the legal hour has made its way with the public, it is difficult to say. In Naples the theaters not subsidized by the government—that is, all but one or two—generally announce their opening something like this: "Beginning at 21 o'clock (9 p. m.)." In Northern Italy, it is more common for them to ignore the new notation; but the government offices, which are many times more numerous than with us, and the railroad time tables must have already made every Italian perfectly familiar with it. As we have noted before, the Italians for centuries were familiar with hours from 13 to 24 as well as from 1 to 12, and in districts which have little intercourse with their neighbors, this old nomenclature has lasted till this day. But while this makes the expression 13 o'clock, etc., familiar to their ears, it does not help at all to an understanding of the actual time implied by the new system; for the old 24-hour day began with the Ave Maria, half an hour after sundown, so that 24 o'clock meant twilight and not midnight as it does now.

Mr. Stickney, President of the Chicago Great Western, says that charging 13 mills per ton per mile for carrying grain on the railroads west of the Missouri River, while only three mills is charged for the same service east of the river, is "the kind of business that makes anarchists." At least, this is the way the newspapers report him. It does not appear whether he blames the roads charging the higher rate, or those charging the lower, or both classes. But what is he going to do about it? If it is the mere difference that makes the trouble we may take comfort in the fact that equally large differences have existed ever since transportation was established, and the anarchists haven't said much about them; in fact, they have said nothing, to speak of, as compared with what they say about a good many other things that do not suit them. The 13-mill rate cannot be too high in itself, as the railroads in that territory do not earn much above their operating expenses. The three-mill rate is too low, but we must assume that it is not below cost, for Mr. Stickney's road is one of those which use it, we believe. In these dull times a road not only may make money by carrying corn at rates a trifle above cost, but it receives, or should receive, the gratitude of the farmers besides. If the rate were raised, cars and engines would stand idle and the track would rust out, for some other road would get the freight. Mr. Stickney knows all this, so that, assuming that the grain would pay a higher rate if

only there were fewer carriers competing for the business, we must assume that he wants the state to raise the rates arbitrarily, a proposition which, in the West, is an idle dream (with no trace of anything so pleasing as iridescence about it); or else that he wants some of the competitors killed off. This last is in many respects the most logical remedy for the present difficulty, for the root of the trouble was the action of the states five, ten and twenty years ago, in authorizing the construction of superfluous railroads. Then was when the people were making anarchists, if ever. But we hesitate to recommend this remedy, because if the citizens were to decide to tear up a few rails they would be likely to begin with Mr. Stickney's, for his road is one of the newest and most needless.

The outcome of the accident at St. Neots,\* where, it will be remembered, an express train was wrecked, owing to the break-up of a rail, has been the appointment of an expert committee by the Board of Trade. The committee, which numbers among its members Sir Benjamin Baker, Sir Lowthian Bell, Professor Kennedy, Major Marindin, the senior inspecting officer of railroads, and other equally distinguished authorities, is directed to inquire "as to the extent of loss in strength of steel rails from their prolonged use on railroads under varying conditions, and what steps can be taken to prevent the risk of accidents arising through such loss of strength." There has also been an interesting discussion as to the comparative merits of the chair and flat-bottomed-rail types of permanent way carried on in the columns of the *Engineer*. This influential journal, whose editor is apparently inclined to believe that everything English is perfect and everything foreign more or less wrong in proportion as it more or less deviates from English practice, announced in an editorial at the commencement of the discussion that to construct a first-class road of flat-bottomed rails without chairs was an obvious impossibility. After the discussion had been carried on for some weeks, and certain correspondents had shown that the English permanent way has remained practically unaltered for a generation, during which weights and speeds of trains have both vastly increased; and after certain other correspondents had shown that American roads, with flat-bottomed rails are carrying in safety greater weights at higher speeds, and, further, that American companies, having experimented with the English type of road, had deliberately rejected it as inferior, the *Engineer* has published a second editorial article, in which the editor appears to have been sufficiently educated to admit that, after all no one system possesses an absolute superiority and, though the English method of construction may be the best for England, the non-English method may quite possibly be the best elsewhere. If the outcome of the Board of Trade Committee and of the controversy in the journals were that English railroad men came to regard railroad problems from a slightly less insular point of view, both the traveling public and the railroad shareholders might profit considerably. But for us the really important result of the whole matter will be, we doubt not, the report of this special committee. From this body we shall expect a valuable addition to the knowledge of a perplexed subject.

#### A Plutocratic Popocrat.

The American Merchant Marine Association is a young but ambitious body. It is engaged in a scheme designed to procure for a very small body of men a very great deal of money at the expense of the nation at large and through the aid of the National Government. No body of men in recent times, except the owners of the silver mines, has foreseen such magnificent profits consequent upon successful delusion of the voters of the nation.

This association was organized last April, its purpose being to have such laws enacted as would place a discriminating duty of 10 per cent. on all goods not imported to the United States in American bottoms, which, of course, would eventually drive out of our foreign commerce all foreign-built ships, and would give to the American shipbuilders such a harvest as few men, other than the silver-mine owners, have ever thought possible. It must be remembered that American shipping is already pretty well protected, inasmuch as no American can own and sail, under the flag of the United States, a foreign-built ship. The New York and the Paris were admitted to American registry by a special act of Congress. Furthermore, no foreign-built ship can engage in coastwise trade.

But this was not enough. The American Merchant Marine Association was organized and began working the state and national conventions with considerable

success, so far as promises go. According to the Secretary of that association, in letters written over his own signature, it will be necessary to build "several hundreds of millions of dollars' worth of ships to carry our imports and exports." This being the case, it is not wonderful that the Secretary should add, "We are out to win, and it takes votes to win, and we want Democratic votes as well as Republican votes." He, this Secretary, has great hope of the aid which the association will get from the present Democratic candidate for Vice-President of the United States, for astonishing as it may seem, Mr. Sewall is the President of the American Merchant Marine Association. The Secretary says that Mr. Sewall "can do us an immense amount of good, and is disposed to and will among his own people. . . . His interest and convictions in the matter would be weighty in Democratic councils, possibly potential." The candidate of the People's party, seeking the votes of those who for years have been fighting for low tariff or no tariff, who have been opposed and are opposed, on conviction, to protection; the candidate of those who have declared war to the knife on plutocrats and monopoly is himself a plutocrat, a monopolist and a protectionist of a singularly selfish type.

The publication of all of these interesting facts is due to Mr. John Thomson, Treasurer American Society of Civil Engineers and Member of the American Society of Mechanical Engineers, whose delightful correspondence with Mr. Smith, the Secretary of the Merchant Marine Association, has just been made public. Mr. Thomson was asked to contribute cash to help the association along, which he declined to do, adding, "If your Mr. Sewall wins, he will have the strength of his Populistic electors, and instead of trying to prevent foreign ships from entering our ports, we may then be glad enough to have them wait upon us. . . . When the American Merchant Marine Association is manned by a representative who stands for one hundred cents on the dollar call upon us again." We advise our friends to read those letters by all means. They were published in the *Evening Post* (New York) of August 11.

#### Financial Results of Working English Railroads.

The half-year just ended has been one of the most prosperous the English railroad companies have known for a long while past. Compared with the corresponding half of the year 1895, the earnings have increased by over two million pounds sterling, about equally divided between freight and passengers, an increase, that is, of between five and six per cent. The highest aggregate increase, £285,000, is shown by the North Western, but this only corresponds to a percentage increase of 5.2, whereas the Great Western with £273,000 gross has a percentage increase of 6.5 and the North Eastern with £258,000 gross, a percentage increase of no less than 7.7.

The large increases of traffic, coupled with the rapid drop in the rate of interest, have driven up the price of English railroad shares to an unheard-of height. South Western shares are at 216 per £100 ordinary stock; North Westerns have gone to 206, Great Westerns to 187, North Easterns to 184, Midlands to 170. It is only two or three years since that several great companies consolidated their debentures into 3 per cent. securities, and at that time the price was just about par. 10-day the 3 per cent. debentures of the North Western are quoted at 123, and as a natural result further capital re-arrangements are already in progress. The Great Western has raised a considerable sum by the issue of 2½ per cent. debentures; the Midland has gone further and announced its intention of seeking Parliamentary sanction for a complete re-arrangement of its entire capital. This company proposes to convert the whole of its pre-ordinary stock, debentures, guaranteed and preference stocks alike, into stocks at the uniform rate of 2½ per cent., and further to divide the ordinary stock into two portions, preferred and deferred, by issuing for every £100 of existing ordinary, £100 preferred ordinary, carrying interest at 2½ per cent., and a second £100 of deferred ordinary, which will take whatever income remains over available for dividend.

It will be remembered that English railroads have nothing corresponding to the terminal obligations common in America and on the Continent. The only method, therefore, of converting 4 per cent. debentures or preferences into 2½ per cent. is to secure to the existing holders the same rate of interest that they are at present receiving; in other words, to increase the nominal amount of their holding from £100 at 4 per cent. to £160 at 2½ per cent. The total result of the Midland scheme for consolidating the prior charges and doubling the ordinary shares will therefore be to increase the nominal capital of the undertaking from about 100 to about 171 millions of pounds sterling.

There is no doubt a considerable theoretic objection

\* Great Northern Railway, England. See *Railroad Gazette*, May 8, 1896, p. 322.



to concealing in this manner the actual cash cost of the line, but so far no objection has been raised from this point of view. The only opposition hitherto expressed has been on the part of certain ordinary shareholders who complain that the scheme for the division of their stock is compulsory, whereas it should be left to their option either to divide their stock or retain it undivided.

#### The Austrian Ministry of Railroads.

Within a month or two we have mentioned the fact that a Ministry of Railroads has been created in Austria and that this administration will hereafter be separate from that of the Ministry of Commerce. The new bureau will include only railroads and the steam navigation on Lake Constance. It will have no control over tramways or river and sea navigation other than as mentioned above. On Jan. 19 the control of the state railroads was transferred to the new ministry under Lieutenant-General Count von Guttenberg. The *Bulletin* of the International Railroad Congress contains a long account of the new and the old organization, written by Mr. Albert Eder, who says this is one of the most important events in Austrian railroad history.

The organization as now established consists of three chief parts, the Central Directorate, the Traffic Directorates and the State Council. There are 11 traffic directorates, varying in length from 192 miles (Trieste) up to 669 miles each. It must be remembered that a traffic directorate is not an organization for procuring or dealing with what we call traffic in this country, but is an operating or transportation bureau.

The state railroad system began in 1876 and 1877, but no central state administration was then formed. At first the small state railroads were generally worked by neighboring companies. In 1893 the directorate of state railroads was established at Vienna under Baron von Czedik and the organization of the State Railroad Council soon followed. In 1894 the state took over certain lines, more than doubling its mileage, making it, in fact, 3,170 miles, and it appeared to be necessary to establish a more highly organized system of administration.

It is suggested that, after all, it is doubtful if a ministry for railroads was really required, and it is doubtful if it is wise to put the railroads in a ministry by themselves. For instance, Austria subsidizes Lloyd's and the Steam Navigation Company on the Danube, but water navigation is so closely allied with the railroads in rates and organization as to make a separation difficult in practice. The traffic of the only Austrian seaport is maintained by through rates by means of protective duties and differentials, but the Ministry for Railroads has no direct authority over the water companies, and consequently cannot control rates.

But the railroads of Austria require to be managed with exceptional energy and singleness of purpose and good may come from the concentration of interest. It is believed that reorganization of the Austrian railroad was absolutely necessary and further that if the new system is carried out thoroughly the machine "will be freed from a crushing weight and will be rebuilt on a simple and well-considered design, and it will be well balanced by the supreme administration being centralized and increased liberty being left to the various executive branches."

The fundamental idea of the new organization is making the traffic directorates co-ordinate with each other in power, independent of each other, and subject only to the direct authority of the Ministry. The great duty of the Ministry will be to harmonize the work of the directorates. It has no longer to look after direct management except in the case of tariff changes, building new lines, arrangement of important time-tables, purchase of rolling stock and decisions on financial questions; and the directorates are independent in bargains up to £4,200, and even up to £12,000 if the contract is open to public tender.

#### Further Consideration of the Atlantic City Collision.

Some who have read the testimony at the inquest on the Atlantic City collision seem inclined to blame signalman Houser for his alleged poor judgment in not holding the slow train instead of the fast one; and three of the jurymen have signed a verdict to this effect. Without stopping to question the accuracy of his assertion that to have held the excursion would have caused more delay than to have held the other train, it is in order to remark that whatever defect of judgment there was, it has no place in a discussion about safety. If we were considering a mere matter of convenience it might be proper to discipline a signalman for delaying one train when he ought to have held another instead; but that is not the point. The signals at a crossing are worse than useless if they

cannot be used at any time to stop any train. No one would ever think of making rules for a crossing which should encourage an engineman to think that he could feel more sure at one time than at another to find the crossing clear for him.

Evidence was presented before the coroner to the effect that the agreement, under which this crossing was established, provided that the Reading trains should have the preference, and this seems to have beclouded some minds. They fail to observe that this clause applies to two trains of the same class applying for leave to cross at the same instant. If the signalman decides that a Pennsylvania train will be ready to cross half a minute before a Reading train will, he has no use for this rule. It should also be noted that under the agreement the "flyer" and the excursion train are on precisely the same level; the former has no superior right at the crossing because it runs faster. So far as safety is concerned, and consequently so far as concerns the question of responsibility for loss of life, Houser should have perfect freedom to hold an express train all day, if he choose, without regard to whether the crossing is obstructed by an excursion, a freight or even a mud train. A moment's reflection shows that this is the only possible rule that would work.

The coroner has elicited nothing important, in addition to what we reported last week, except the testimony of the conductor of the Reading train, who says that he heard his engineman, Farr, after whistling for the crossing, blow two short blasts, indicating that he had seen a clear signal, and that immediately after this the crossing whistle-signal (one long blast) was repeated; from which the conductor infers that the semaphore signal, after being cleared, was again placed at danger. The verdict of the jury makes no mention of this evidence, and so far as we can judge no weight should attach to it. The conductor seems not to have stated where the train was when the whistling occurred, whether short of the distant signal or beyond it. It does not appear that the fireman and the conductor were cross-examined to make these statements correspond, each with the other, but the fireman said nothing about this unusual whistling, and he saw the distant signal at danger before passing it.

The Atlantic City collision calls to mind the rule, long used with satisfaction on some roads, requiring the fireman (as well as the engineman) to observe all fixed signals and to *speak to the engineman*, unless the latter first speaks to him. Why is not this rule more generally prescribed? So far as we know only a very few roads use it. It is not an easy one to enforce, but cautious enginemen and firemen, after experience with it, are disposed to obey it without urging. On some engines the fireman is several yards away from the engineman and they would have to communicate by some other means than word of mouth, but that is not an insuperable difficulty. The Reading engine in this collision had a large, wide firebox, but the fireman says that he was in the cab before they passed the distant signal. He did not, however, see the signal until he was very close to it, and he did not speak to the engineman because the dome was between them. If he had been in duty bound to look for this signal he would in all probability have looked for it a mile back of this point. The mere fact that they have to speak to each other on the subject leads both engineman and fireman to look earlier than they otherwise would.

In case there were a dense fog a fast train on the Atlantic City road would have to reduce its speed at the meadows crossing so as to be able to stop within 1,000 ft. (that is, after passing the distant signal) or from 60 miles an hour to, say, 40 or 30. Why not make this the rule for all weather? By a long course of experience and instruction the rule to reduce speeds at numerous crossings and other places from 40 and 50 miles an hour down to 20 or 15 has been made universal all over the country and it seems to be obeyed with reasonable uniformity; but a rule to reduce from 60 to 30, based on precisely the same principles and just as easy to carry out, seems to be established with difficulty. Is this because racing—either with another train or with the second hand of a watch—has produced such a chronic excitement of the nerves as to make enginemen forget the simple rules of safety which years of caution have taught them?

In writing last week of the Atlantic City collision, we said that there is a complication of signals, the existence of which has not been mentioned in the published evidence. There is a disk signal on the same post with the semaphore signal, and we conjectured that it was just possible that the unfortunate engineer of the Reading train had been misled,

that he had seen the disk signal clear and had not looked for the semaphore. We are informed that the automatic disk signal, which actually is on the same post with the semaphore, is so connected with the semaphore blade that unless this latter is in the safety position the automatic signal cannot clear.

The question of the brake power on the Reading cars and engine is an interesting one, for the train was running very fast; but it seems like placing a very unfair burden on the machinery to bring up this question in a case, where, like this, there was ample distance in which to stop, even with very poor brake power. There was no evidence at the inquest on this point.

The growth of traffic on German inland waters is the subject of a document from the statistical office of the Empire. On the Oder, which has been improved meanwhile 81,000 tons went down from Breslau in 1880, and 56,000 came up; while in 1894 1,340,000 tons went down and 664,000 came up. On the Elbe and its branches, at Hamburg, a yearly average of 1,825,000 tons was shipped up from 1881 to 1885, and 1,212,000 tons came down; in 1894, 3,242,000 tons went up and 1,920,000 came down. Sugar made 41 per cent. of the receipts. The movement by water to and from Berlin was greatest in 1891—receipts, 3,035,000 tons; shipments, 2,220,000. In 1894 the Berlin water receipts were 61 per cent. stone, 17 per cent. fuel, 11 food products, 5 timber and 6 per cent. merchandise. On the Rhine at the border where it enters Holland, the shipments up were from 1881 to 1885 a yearly average of 1,899,000 tons; down, 2,860,000; in 1894, 5,243,000 up and 3,456,000 down. In 1894, 35 per cent. of the imports were ore, 30 per cent. grain, while the other chief articles were petroleum, oil seeds, timber and iron. Of the exports, 56 per cent. was coal; the other leading articles stone, manufactured iron and cement. The timber rafting up across the Dutch border amounted to 44,000 tons in 1891, and has decreased considerably since.

The recent renewal by the New York, New Haven & Hartford of a loan for \$3,000,000 has brought out a good deal of meaningless and misleading newspaper talk. For one thing, it is stated that the company will thus secure a large fund to carry on the improvements now in progress. This sage remark must be based on the novel assumption that in renewing a loan the borrower gets once more the amount of money he originally borrowed. This is a brilliant discovery in finance. When it gets to be widely known bankruptcy and receiverships will be no longer heard of. As a matter of fact, the transaction has no connection, remote or present, with the four-tracking or other new construction work. Last year, on the reorganization of the New England road, the New York, New Haven & Hartford purchased \$5,000,000 of the bonds issued by the new company. A controlling interest in its stock was also purchased. In such a large transaction it became necessary to borrow, to pay for the bonds and stock. A loan for \$3,500,000 was negotiated at 3½ per cent. This year a half million of this sum has been paid, and the balance has been recently renewed for a year. Owing to the present uncertain financial conditions, the loan could not be renewed at the original rate of 3½ per cent. and the company will have to pay 4½ per cent. Still, even at the higher rate of interest, the transaction is not by any means a losing one for the New York, New Haven & Hartford, for it receives five per cent. interest on the bonds of the New England Company which it holds in its treasury.

The Philadelphia & Reading will shortly relieve its main line, near Philadelphia, of the numerous coal trains, which now seriously interfere with the movement of traffic, by routing coal for seaboard ports over the Plymouth Branch, from Conshohocken to Oreland. The main line between Falls of Schuylkill and Wayne Junction, just north of Philadelphia, is a busy piece of track, and the movement of coal trains is frequently seriously delayed. To avoid these delays, the company is connecting its North Pennsylvania Division with the Plymouth Branch at Oreland, and with the New York Division at Jenkintown. The only new construction involved is the building of a "Y" at Oreland and another at Jenkintown. The whole expense will be small and the advantages to the railroad are considerable. Besides saving the detentions which occur in running the coal via Wayne Junction, nearly five miles in distance will be gained between the anthracite regions and New York. The connections are nearly completed and within a short time the coal trains from the Schuylkill Valley at Norristown will be sent over the new route.

The Rapid Transit Commissioners of New York have rejected the plan presented to them by the Manhattan Railway Company on the ground that the Commission has no power to authorize a surface road as was proposed for a part of the extension of the Manhattan. The Commissioners have instructed Mr. Parsons, their Chief Engineer, to prepare the general plan for a system on a modified route, the total cost after "abundant allowance for contingencies not to exceed \$30,000,000." This route will be from near the Post Office, under the City Hall Park and Park Row to Elm street; thence to Fourth avenue and to or near the Grand Central Station, where it will divide into an east and west side



route, these to be carried up as far as the proposed limit of cost will permit. The stem portion is for four tracks and the upper portions two tracks each, with provision for a third track for express service when that is "conveniently and economically possible." The new road is to be in tunnel except on the east side north of Ninety-eight street and on the west side at Manhattan Valley, 125th street. The plans are to be so drawn as to permit further extensions from the northern and southern termini, also to permit four tracking on the portions to be built at first with less than four tracks. We presume that this course is the best that the Commissioners could take under the circumstances, for we question very much if the Manhattan Company cares to submit an acceptable proposition.

The subject of unnecessary railroad crossings was referred to last week in connection with the Atlantic City collision. An instance of the apparent disregard of dangerous conditions, in the establishment of railroad crossings where traffic is very light, is reported this week from Texas, where the Southern Pacific has secured a temporary injunction forbidding the construction of a track across its line for the new Texarkana & Fort Smith Railroad. It appears that the Southern Pacific makes no objection to a crossing in a suitable locality, but that the line surveyed by the new road crosses the Southern Pacific at a point where the latter is built on a trestle, and it will be necessary to move the Texarkana & Fort Smith line only 525 ft. eastward in order to get a suitable location. Familiarity breeds contempt, and men constantly surrounded by railroad dangers sometimes seem to be as fond of tempting fate as a Blondin. Crossings are dangerous and trestles are dangerous; the danger factor is indefinite in both cases, but the fact that the two dangers at the same place increase the risk is perfectly clear. It may not be as clear as that two and two make four, but it is as clear as that two and two make more than two.

#### NEW PUBLICATIONS.

*Steel: A Manual for Steel Users.* By William Metcalf. 12mo. 169 pages. New York: John Wiley & Sons, 1896. Price, \$2.

Given, a man who has practiced an art assiduously and with loving interest and with great success for 27 years and who writes about it, not for the sake of making a book but because he really wants to tell other men what he has found out about that art; let that man have a deep and abiding dislike of all manner of pedantry and long-windedness; let him have a well-practiced faculty of clear and simple expression, and it would be astonishing if he did not produce an uncommonly good book. All of these assumptions are true in the case of Mr. Metcalf, and his little book of 169 12mo. pages is destined to be a classic. According to the Century Dictionary, one of the definitions of a classic is "serving as a standard, model or guide" and Mr. Metcalf's book will long serve, we doubt not, as a standard and guide for steel makers and steel users, and, we hope, as a model for other folks who feel called on to write books. It is crammed full of acute observations and wise deductions and if it has any fault, it is too compact. Probably many a reader will find topics which he would like to have expanded, but certainly no reader will be troubled by the author's verbosity.

Mr. Metcalf first describes the four general kinds of steel, cemented or converted steel (known to the trade as blister steel, etc.), crucible cast steel, Bessemer steel and open-hearth steel. The methods of making these steels are briefly described, and then their applications and uses are considered. Here, it is not surprising to find that Mr. Metcalf says: "For all purposes crucible steel has proved to be superior to all others." Comparative tests to demonstrate this are lacking, but this is the consensus of judgment of the most intelligent steel users. Mr. Metcalf considers three samples of steel, crucible, open-hearth and Bessemer, of precisely the same analysis as regards carbon, silicon, phosphorus, sulphur, copper, arsenic, etc., and asks, why should there be any difference in the strength of the three? Taking hardened and tempered samples of these steels, crucible steel is found to be incomparably finer and stronger than the others, and open-hearth steel almost invariably stronger and finer than the Bessemer. Where is the difference? Mr. Metcalf thinks that it is in the elements oxygen, nitrogen and hydrogen. In the crucible, no more of these elements can get into the steel than is contained in the material charged and in the atmosphere of the crucible or may penetrate the walls of the crucible during melting. In the open-hearth the process is an oxidizing one, and the charge is swept continuously by hot flames containing all these elements. In the Bessemer process all these elements are blown through the mass of the steel. This interesting phase of steel making Mr. Metcalf discusses at some length.

In his next chapter he considers alloy steels and their uses, and then he takes up the subject of carbon and its effects on steel.

The succeeding chapters treat of the general properties of steel; the effects of heat and of cooling; of forging and of rolling, etc. Subsequent chapters treat more in detail of heating, annealing, tempering, grinding, of impurities and their effects, of inspection and specifications. One chapter is devoted to humbugs. Probably no other writer on steel than Mr. Metcalf would have devoted a chapter to this important subject and his chapter is short—only three pages—but instructive in indirect ratio

to its length. "Among the most absurd of such claims are those where a nostrum is used to convert ordinary Bessemer or open-hearth steel into the finest of tool steel equal to the best crucible steel. For example, a patent to convert mild Bessemer steel into the finest tool steel by merely carbonizing it by the old cementation process takes no account of silicon, manganese, oxygen and nitrogen in the mild Bessemer; makes no provision for their removal and involves a costly method of putting carbon into poor stock, in face of the fact that a Bessemer steel maker can put the same amount of carbon there at practically no cost and produce a better material." "Another pet is some greasy compound for toughening high steel. This is done by heating the steel to about recalcense and plunging it into the grease two or three times and then working it into a tool. This will make a good tool; but take a similar piece of steel, heat it in the same way, lay it down in a warm, dry place alongside the forge fire and let it cool, and then heat it and work it into a tool and it will beat the greased tool."

There are many passages in Mr. Metcalf's book which are really stirring, dealing as he does, with knowledge and devoted interest, with a material so sensitive and displaying in its manipulation such a variety of beautiful phenomena and capable of such varied and important results. Surely, no intelligent person who begins to read the book will stop until he has finished it, which according to the reviewers is one of the best tests of an entertaining story; and we can guarantee that the man who does finish the book will have absorbed, whether he wishes to or not, an amount of valuable information which will surprise him.

*Swiss Locomotives.* By Camille Barbey. Folio, 148 pp. with 80 phototypes and 81 lithograph plates. Geneva: Ch. Eggimann & Co., 1896. Price \$12.

In its physical aspect, simply as a piece of book-making, Mr. Barbey's volume is uncommonly beautiful. It is the sort of book that is seldom made outside of France. The type is large and clear, the type page is 7 in. x 10½ in. with broad margins, the paper is heavy and sufficiently calendared to show delicate engravings to advantage and yet is without disagreeable luster. The phototypes which are interspersed through the text are beautiful examples of the art. The lithographs, of which there are 82 plates, most of them double pages, are also very good examples, although not quite so satisfactory as the text, in that the lettering has been reduced too far sometimes, and in some of the plates the lines are feeble but distinct; but, generally speaking, the lithographs are entirely legible and they are frequently handsome specimens of careful detail work.

The scheme of the book is to give a brief description, with copious illustrations, of the locomotives used on the five chief Swiss systems, namely, the Jura-Simplon, the Central Swiss, the Gothard, the North Eastern and the United Swiss Systems. About 33 different engines are shown by line drawings. The description in each case is very condensed, being confined to a general account of the service for which the engines are designed, the arrangement of the principal parts and the dimensions and weights. The engines are illustrated in the text by phototypes which are so excellently made and printed that they show clearly such details as are visible from the exterior. The lithographs show longitudinal sections, vertical and horizontal, and cross sections, on different planes and give the dimensions of all of the principal parts.

The engines treated of cover freight engines and express passenger engines for standard-gage roads of the first class, also for standard-gage road of the second class, that is, for comparatively light and local traffic, all of these being simple engines; also simple engines for narrow-gage roads, locomotives for rack roads and finally compound engines. This chapter on compounds is of considerable length and shows a variety of engines. The last chapter gives some information on the technical working of Swiss railroads. It considers the subjects of continuous brakes, speed indicators, continuous heating of trains by steam, lighting by electricity, the apparatus for intercommunication in trains and finally signals. This is not a discussion, but simply a brief description of Swiss practice, with good engravings of the various brakes and speed indicators.

The text is in French, but the illustrations are so full that even for the man who does not read French the most valuable part of the information is quite available.

*Journal of the Association of Engineering Societies.* June, 1896. John C. Trautwine, Jr., Secretary, 257 South Fourth street, Philadelphia.

This issue of the journal is devoted almost entirely to hydraulic gates, weirs and movable dams. It contains eight articles on these subjects, covering 85 octavo pages. There are also numerous valuable engravings. These articles are by various specialists. One paper is by Major Marshall, of the Corps of Engineers, in the preparation of which Lieut. Henry Jervey, of the same corps, has co-operated, giving very thorough analyses of Marshall's bear-trap dams. Another paper is by Lieut. Col. W. A. Jones, of the Corps of Engineers; another is by Capt. H. M. Chittenden, and still another is by Lieut. Col. Stickney, of the same corps. The other articles are by U. S. Assistant Engineers who have done this class of work.

In the same issue of the Journal is a short paper on "Highway Bridges" by Carl Gaylor.

Messrs. John Wiley & Sons announce for next Novem-

ber a new work on engineering materials entitled *The Materials of Construction*, by Prof. J. B. Johnson, of Washington University, St. Louis, Mo. This work will include: 1. A review of the principles of mechanics applicable to the strength of materials. 2. A description of the methods of manufacture of iron and steel, cements, paving-brick, etc. 3. Testing-machines and methods of testing the strength of materials. 4. The properties of materials of construction as determined by actual tests.

*The Street Railway Guide of Eastern Massachusetts* is a small pamphlet compiled and issued by Mr. R. H. Derrah, 286 Washington street, Boston. The scheme of the guide is to show the lines of the West End Railway Co. in Boston and suburbs, and of other electric lines to nearby towns, which have continuous electric railroad connection with Boston. An index of about 150 towns refers to the page on which the route from Boston is given in tabular form. For instance, it is possible to go from Boston to Nashua, N. H., by electric street railroad, the distance being 49 miles and the time consumed four hours and 35 minutes. Other routes described are to Hopedale, 36 miles from Boston; to Gloucester and Rockport, 39 miles; to Brockton, 23 miles; and to Walpole, 19 miles. Generally several alternate routes are given. In each case all the intermediate towns are named as well as the distance, rate of fare and schedule time from Boston and between towns; the number of cars run per hour and points of transfer to towns on short branch lines. Several pages are needed to name the points reached by the West End Railway Co., and the principal points in Boston where cars for the innumerable suburbs reached by this company can be boarded. A folding map shows the electric and steam lines about Boston as taking in Newburyport, Lowell, South Framingham, Brockton and Nantasket.

The guide has evidently been carefully prepared to insure its accuracy, and must be a valuable aid to any one using the electric lines about Boston. To us the chief interest is the remarkable showing of the extent to which the steam railroad lines have been paralleled.

#### TRADE CATALOGUES.

*Machine Tools.*—The Newton Machine Tool Works, Vine and Twenty-fourth streets, Philadelphia, send us a pamphlet especially describing a new boring, drilling and milling machine, which, "while it is a perfect combination of boring, drilling and milling machine, is not at all complicated." The machine is especially adapted to locomotive repair shops. The same pamphlet has pictures of a number of other machines.

*Machine Tools.*—The Hilles & Jones Co., Wilmington, Del., have recently issued "Catalogue M," being illustrations of new and special machine tools and recent designs for working iron and steel plates, bars and structural shapes. The pamphlet contains 40 pages, all given up to illustrations of heavy machines, such as punches, shears, bending and straightening machines, and planing and milling machines. Of course a number of these are shown arranged for electro driving.

#### A Twist Drill with Oil Tubes.

The Cleveland Twist Drill Company is selling a twist drill with lubricating tubes, as shown in the engraving. These drills are now supplied in regular stock in sizes from ¼ in. to 1 ½ in. diameter and with straight or tapered shanks. The method of inserting the tube is quite apparent from the engraving. A groove is cut with a milling machine large enough to take in the brass oil tube which is soldered in place. At the lower ends these tubes discharge the oil close to the cutting edge of the drill. The upper ends project, as seen in the engraving, and furnish means of making an attachment such that oil can be forced through the tubes. The thorough lubrication provided by this arrangement keeps the drill from heating, and it is said that the introduction of the oil under pressure helps materially in removing the chips from the drill hole.

#### The New Lock at Sault Ste. Marie.

Mention was made in the *Railroad Gazette* for Aug. 7, of the official opening, on Aug. 3, of the new lock at the Sault Ste. Marie Canal. The building of the lock has extended through a period of over nine years, it having been begun on May 4, 1887. The lock is 800 ft. long, 100 ft. wide and 21 ft. deep; the side walls are 1,100 ft. long. From the east end, for 282 ft., the walls are 45 ft. high, and from that point westward they are 43 ft. high. The walls are 29 ft. wide at the base, and retain this width for 10 ft., when, by five two-foot offsets, five feet apart, they are narrowed to 10 ft. in width. At either end the walls are 36 ft. wide from base to top. The cut stone for facing is of the best Kelley Island limestone, and was transported in the rough. The faces of the lock wall consist of 23 courses; in courses 2 to 23 inclusive; the stones were cut 6 ft. long x 3 ft. wide x 2 ft. thick, part of the first course and the capping course being 1½





ft. thick. The cost of the masonry was \$1,085,469. In the basement of the power-house are two 30 H. P. turbines, which will drive three three-plunger single-acting high-pressure pumps, which will deliver the pressure fluid to loaded accumulators, where it will be stored under 300 to 500 lbs pressure per square inch, ready for use, and delivered to the engines as required. The pressure fluid will be a limpid mineral oil, and will be used during the entire season, while the old lock uses water pressure in summer and oil during the cold weather. The lock chamber can be filled and emptied in from six to seven minutes, water being let in through six culverts, which run longitudinally under the lock floor.

The total cost of the work, including approaches, will be about \$5,000,000. The work was begun under the supervision of the late Col. O. M. Poe, who lived to see it practically completed. Gen. Supt. E. S. Wheeler has had active direction of the work.

# TECHNICAL.

## Manufacturing and Business.

The Bucyrus Steam Shovel & Dredge Co., of South Milwaukee, Wis., has recently shipped two heavy steam shovels of improved pattern, one to the Pittsburgh, Shenango & Lake Erie Railroad, which is at work at Conneaut, O.; the other to Winston Bros., contractors for the Northwestern double track between Madison and Elroy, which is at work at Devil's Lake, Wis. These shovels are of the 50-ton size, and are giving entire satisfaction. The Winston machine is their second order for the same size shovel. On July 25, this shovel loaded 226 cars of gravel and clay, with some stones, in eight hours' actual working time. The cars were standard flat cars, holding about 9 cu. yds. each.

The firm of Thayer & Co., Inc., composed of Winthrop Thayer, of Boston; W. C. Turner, of Philadelphia, and Frank A. Thayer and Rodney Thayer, of New York, has been incorporated to place on the market the Cahall vertical and the Babcock & Wilcox horizontal safety water tube steam boilers, built by the Aultman & Taylor Machinery Co., of Mansfield, O. Mr. H. M. Montgomery, recently with the Goubert Mfg. Co. and the Babcock & Wilcox Co., has become connected with the new firm. The New York office is at No. 39 Cortlandt street.

The Brown Hoisting and Conveying Machine Co. has just received an order for three of its largest size overhead bridge tramways, for handling coal and ore, from the Krainische Industrie Gesellschaft, a large manufacturing concern of Austria. Both this and the Krupp order, noted in these columns last week, are large orders and have been awarded entirely through correspondence.

The Monash-Yunker Co., No. 203 South Canal street, Chicago, has lately been incorporated to manufacture steam and water specialties. It owns and controls the specialties manufactured by the Van Auken Steam Specialty Co., and it has also purchased the patents and plant of the Star Coupler Co., of St. Louis, and will manufacture Star lead pipe couplers and fittings for lead pipe plumbing without the use of solder or wiping joints.

The Central of New Jersey shops at Phillipsburgh, N. J., will hereafter do all the locomotive repairing and building for the road. This decision will result in the transfer of a number of men and a good deal of work from the shops at Ashley, Pa. The Phillipsburgh shops are now running five days a week on 10 hours' time, employing 700 men. Besides repair work a new engine is being built.

After several weeks of idleness the Midland Steel Works and the Indiana Iron Works, at Muncie, Ind., resumed operations Aug. 10 with nearly 500 hands in each mill.

## Iron and Steel.

Both the puddling and plate mills resumed operations at the Mahoning Valley Iron Works, Youngstown, O., on Aug. 3. The mills of the Andrews Bros. Co., at Hazelton, and the South Tenth street mill of the Oliver Iron and Steel Co. at Pittsburgh, Pa., have also resumed work.

The Shenango Valley furnaces produced 297,181 tons of iron in the first half of the present year, as against 411,693 tons in the second half of 1895. Of the 297,181 tons, 251,156 were Bessemer. The Mahoning Valley produced 332,633 tons in the first half of this year, as against 332,491 tons in the second half of 1895.

A new tube works is being built at Greenville, Pa., for the manufacture of weldless steel, copper and brass tubing. The company was incorporated, with a capital stock of \$500,000, by F. W. Ensworth, H. N. Shrom, Carl Buck, G. B. Chase and Levi Morrison. The principal stockholder is Henry A. Lozier, of Cleveland, O.

## New Stations and Shops.

The Chicago, Rock Island & Pacific has decided to construct an 18 stall roundhouse at Valley Junction, a suburb of Des Moines, Ia., to take the place of the roundhouse now at Stuart.

The Louisville & Nashville has let the contract for the building of the new freight house at Montgomery, Ala., to Dodson & Co., of Atlanta. The contract price is \$32,000. The contract for building the tunnel under the tracks through Commerce street to the river was let to Cook & Laurie, of Montgomery, for \$13,000.

The contract for building the new shops of the Boston & Maine road, at Concord, N. H., has been awarded to Mead, Mason & Co. The entire contract amounts to

\$100,000, which is within the first estimate made by the company's engineers. Work on the foundations will be resumed at once by the contractors, Ward & Douglas, Barre, Vt., orders to that effect having already been issued.

The Erie Railroad Co. proposes to erect a new brick and stone station at Rutherford, N. J., and will soon apply to the Town Council for additional land needed to carry out this and other proposed improvements.

The Chicago Great Western is to make important additions to its terminals at Minneapolis, including the erection of a large roundhouse and repair shops near the company's main yards in that city. Plans have been completed and it is proposed to start work shortly and have the buildings completed during the fall.

## Relay Water-Wheel Governor.

A new "Relay" water-wheel governor built by the Replogle Governor Works of Akron, O., was recently tested. The machine uses friction clutches for opening and closing gates. These are thrown into action by a sliding cam, to which are attached two pawls, which are thrown into action by an electrical current from an ordinary gravity battery, passing through magnets immediately over the heavy end of the pawl. The speed governor has a brass lever connected with the governor stem at the base. This lever, indicating changes of speed, makes an electrical contact with one or the other of the magnets, raising a pawl which engages a lug on a reciprocating plate, and throws the friction into action. A compensating device is used in connection with the electrical contact frame and serves to "cut out" before the governor has overdone its work. The governor is designed especially for electric railroad service where the dynamos are run by water power and the load on the machines is variable.

## Electrical Development in Europe, the United States and Canada.

We are indebted to *L'Industrie Electrique* for the following figures in regard to electrical development in Europe. Those in regard to the United States were contained in the President's address at the National Electric Light Association, and the note on Canadian roads was given by George H. Guy, of New York:

There are 560 miles of electric roads in Europe, which is an increase of 125 miles in one year. The number of electric cars has increased from 1,236 to 1,747 in the same time. Germany has 250 miles of electric roads and 857 motor cars. France has 82 miles and 225 motor cars. Great Britain has 65 miles, with 168 cars, and Austria-Hungary has 45 miles, with 157 cars. Next come Switzerland, Italy, Spain and Belgium in the order given, while Russia has but one electric railroad, with six miles of track and 32 motor cars, and Portugal ends the list with 1½ miles. Of the 111 European lines 91 are overhead trolleys, of which there were 35 in Germany, 12 in Switzerland, 10 in France and 7 each in England and Italy, and 6 in Austria-Hungary, etc. Of electric railroads with underground current there were but three at the beginning of this year, one each in England, Germany and Hungary. Nine lines are provided with an insulated central track, through which the current is conducted, eight of these railroads being in Great Britain and one in France. The remaining eight lines are provided with accumulators. Of these four are in France and two in Austria, and one each in England and the Netherlands.

In the United States there is invested in electric mining machinery, \$100,000,000; in 500,000 stationary electric motors, \$60,000,000; number of motor cars, 25,000; total miles of electric road, 12,000; combined capital of electrical railroads, over \$700,000,000. It is estimated that more than 90 per cent. of all the street and suburban roads are operated by electricity and that the total number of men employed in electrical industries is 2,500,000. Almost the entire industry in the United States has been built up during the past 10 years.

There are at present in operation, or being constructed, in the Dominion of Canada, 36 electric street railroads covering about 600 miles, using 750 motor cars, with a total generating capacity of 19,500 kilowatts, and representing an actual investment in round figures of over \$20,000,000. In 1887 the one electric line of Toronto was run on the Van Depoele system, and an old catalogue tells that the plant consisted of one engine, one electric generator, one electric motor, one motor car and three passenger cars.

## Car-Lighting by Electricity in South Africa.

Every little while something appears in the papers about electric lighting on the Cape Government Railways in South Africa. The most succinct and authoritative statement possible is contained in the following letter from a responsible officer of the system of railroads, which includes all but about 188 miles of the railroads in the colony:

"The accumulator system of lighting trains has had an extended trial here, but has proved a failure. An experimental attempt at lighting with a dynamo driven by an oil engine promises to be successful, but seeing that this system of lighting has hardly got beyond the experimental stage, it would be premature to say anything further about it. When we have had about 12 months' experience with the dynamos and oil engines at present under order, we shall be in a position to speak with some authority on this system of lighting."

## New Express Locomotive for the North Eastern, England.

The *Engineer* of July 31 has an engraving and a short description of one of the new express locomotives designed and built by Mr. Wilson Worsdell for the North Eastern Railway. These engines have cylinders 20 in. diameter by 26-in. stroke, and drivers 7 ft. 7½ in. in diameter. The drivers are four coupled; that is to say, the engine is, in this respect, what we in the United States would call an 8 wheeler, and Mr. Rous-Marten, who writes the description from which we quote, says that these are the largest coupled wheels that have ever been used "except as a mere ephemeral and unsuccessful

experiment." He adds also that the front end of the engine is carried on a 4-wheel bogie "which greatly improves the safety when curves are taken and points passed over." Furthermore, the engine is provided with a large and high cab with a clearstory roof "which greatly enhances the comfort of the enginemmen and which I hope to see widely adopted." The reader will suspect from these statements that the engine externally looks a great deal like an American engine, and so it does; although it is inside connected. These engines weigh a little over 50 long tons, and are said to be very light for their power. We have no particulars as to the heating surface, grate area, diameter of boiler, steam pressure, etc.

## Causes of Trains Breaking Apart.

A St. Louis paper prints some statistics of the causes of "break-in-twos" of freight trains on a Western road, where a record is kept of the number charged to each crew, the point at which trouble occurred, together with the cause. Out of 213 trips made during June there were 13 cases where freight trains broke in two. From January 1 to June 30, inclusive, there were 280 break-in-twos, out of 5,162 freight trains run. The record is kept against the name of every engineer and conductor, so that it can be readily noticed if any one crew has more than its share of this trouble. The number of break-in-twos on the west end of the road during the year ending June 30 has slowly decreased from 4.5 cases in every 100 trips made during July, 1895, to 2.9 in June, 1896, which demonstrates the success attained by keeping a check on irregularities.

Out of the total number of break-in-twos, 30 per cent. were caused by drawbars pulling out; 49 per cent. by pin breaking; 6 per cent. by pins jumping or working out; 5 per cent. on account standard M. C. B. couplers becoming uncoupled; 7 per cent. by links breaking; 5 per cent. by breaking drawbars; 4 per cent. by drawbar keys coming out or breaking; .04 per cent. by knuckle breaking; .08 per cent. chains breaking, where drawbar had been previously pulled out and car chained up; .04 per cent. by someone pulling pins; cause not given, 2 per cent. Steel pins break more frequently than iron.

## A New Cement Works.

The Illinois Steel Company has converted a part of its North Chicago works into a cement plant, and is turning waste furnace slag into "Illinois Steel Portland Cement." The slag is granulated in water, then roasted, and mixed with lime and other ingredients. The product is ground to powder and put into bags for market.

## Fast Cruisers for Japan.

The Japanese Legation in Washington, D. C., opened bids on July 22 from American shipbuilders for the construction of two fast cruisers for the Japanese navy. The bids were not open to general competition, William Cramp & Sons Ship and Engine Building Co., of Philadelphia, and the Union Iron Works, of San Francisco, being the only concerns invited to bid. The general type of the vessels was specified as that of the Yoshino, one of the Japanese navy's newest ships. The Japanese Government gave only a general outline of the plans. The contractors were accordingly requested to prepare and submit complete plans and specifications.

## A New Ocean Record.

The steamship St. Louis, of the American line, arrived in New York on Aug. 7, having broken the record for the westward passage from Southampton, previously held by her sister ship, the St. Paul, by three hours and eight minutes. The trip was made in six days, two hours and twenty-four minutes. The average speed was 20.86 knots per hour and the distance traveled was 3,055 knots, the vessel having gone over the shorter course. The daily runs were 477, 519, 530, 520, 510 and 499 knots to the Sandy Hook Lightship. With the exception of occasional fogs, fair weather prevailed throughout the whole trip.

## A New Steamship for the Cromwell Line.

The steamship Creole, of the Cromwell line, which will run between New York and New Orleans, was launched on Aug. 8, by the Newport News Shipbuilding and Dry Dock Company. She is a steel vessel, 375 ft. long, 44 ft. beam, and 32½ ft. deep. She is built from designs furnished by Mr. Horace See, of New York, and is the first vessel in the coastwise trade with a double bottom. She has two steel pole masts, is lighted by electricity. She has accommodation for 75 first class passengers and 150 steerage passengers.

## Block Signals.

The National Switch & Signal Co. has been awarded the contract for installing 46 sets of block signals for the Ulster & Delaware Railroad.

## The Boston Subway.

The bids for the steel work for section 10, extending from Hanover street to Haymarket square, were opened last week and were as follows: The Edge Moor Bridge Works, Wilmington, Del., \$53.83 per ton net; Passaic Rolling Mills Co., Paterson, N. J., \$51.80; A. & P. Roberts Co., Philadelphia, \$44.40; Carnegie Steel Co., Pittsburgh, \$42.20; Pennsylvania Steel Co., \$60; New Jersey Steel and Iron Co., Trenton, N. J., \$51.42; The Marshall Foundry and Construction Co., Pittsburgh, \$49.48. The Commissioners have taken the bids under advise ment.

## Steel Imports in 1896.

The following table is compiled from the monthly summaries of the Bureau of Statistics of the Treasury Department, and shows in tons the amount of iron and



steel imports of the United States in March, April, May and June, 1896:

Articles, gross tons.	March, 1896.	April, 1896.	May, 1896.	June, 1896.
Pig iron.....	6,795	8,255	6,286	5,371
Scrap iron and scrap steel..	433	242	1,740	1,710
Bar iron.....	861	696	1,054	1,712
Iron and steel rails.....	86			20
Hoop, band or scroll.....			3	24
Steel ingots, billets, blooms	2,169	2,517	1,876	1,448
Sheet, plate & taggers', iron	611	496	706	724
Tin plates, etc.....	8,220	10,230	11,321	10,222
Wire rods, iron and steel..	1,765	1,569	2,153	1,590
Wire and wire rope.....	479	364	295	327
Total.....	21,419	24,360	25,439	23,218
Iron ore.....	71,992	61,326	48,617	59,156

#### A Very Heavy Train.

The longest and heaviest train that was ever taken East over the Lehigh Valley Railroad was a coal train recently run experimentally to Perth Amboy. It was made up of 240 loaded four-wheeled coal cars; the actual weight of the train was 2,468 tons of 2,000 lbs. each, and its length was 3,120 ft. The train was hauled by a Baldwin locomotive, No. 718, the dimensions of the locomotive being: Weight on drivers, 106,500 lbs.; weight on truck, 30,000 lbs; weight of tender, 84,000 lbs.; drivers' diameter, 62 in.; cylinders, 20 x 24 in.; boiler pressure, 160 lbs. The train was taken through to its destination without any difficulty.

#### Mineral Production of the United States.

The Director of the Geological Survey at Washington has issued statistics of the mineral production of the United States for a series of years. The value of the mineral output in 1895, over \$610,795,000, was greater than in either of the two previous years, and larger than in any recent year prior to 1890. The maximum valuation was in 1892, over \$647,646,000. The value of silver is figured at \$1.2929 per troy ounce, which is nearly

remained in the entrance alongside of the west quay wall. Her bows were discovered to be very badly stove in, and the forward compartment filled with water to the outside water line. The other bulk-heads and watertight doors, however, held firmly, and the water was confined to the forward compartment. The Commandant's barge has not been seen since the accident. She was sunk to the bottom of the dock. The caisson is sunk and lies on its side a short distance within the entrance of the dock. It has been examined by divers, and is thought to be but little injured.

According to such rough estimates as can be made at present, the cost of repairing the damage caused by this occurrence will be from \$14,000 to \$23,000.

#### THE SCRAP HEAP.

##### Notes.

The Cincinnati, Jackson & Mackinaw has made a 1 per cent. reduction in salaries above \$40 a month. The trainmen, shop employees and section men will be put on shorter hours.

The large car shops of the Detroit, Lansing & Northern at Ionia, Mich., were badly damaged by a storm on Aug. 10. The freight house at the same place was set on fire by lightning and destroyed.

The average weight of 500 Pennsylvania Railroad freight cars, of 30 tons capacity each, recently weighed by the Pennsylvania Railroad, was found to have decreased in 13 months 1,568 lbs. per car.

The Missouri, Kansas & Texas has issued a circular similar to that of the Southern Pacific, noted in these columns last week, announcing that the practice of enforcing discipline by suspension is discontinued. It is stated in a Cincinnati paper that Brown's discipline is to be adopted on the Columbus, Hocking Valley & Toledo.

The Brooklyn Board of Assessors has fixed the valuation of the elevated railroad structures in the city at \$150,000 per mile. This is a reduction of \$20,000 a mile from the rate at which the companies have been paying for several years past. The companies claimed that

equipment of the state roads, to improve the port of Talcahuano, lay a cable to Punta Arenas, etc.

The traffic receipts of the Peruvian Corporation, Limited, for the six months ending June 30th, amounted to 1,518,700 soles (the sol being worth about 49 cents), which is an increase of 359,990 soles over the receipts for the corresponding period of 1895.

It is stated that an American company has been organized to build a railroad for Chénepe to Hualgayco, Peru, to work coal and other mines in that locality. The well-known importance of these deposits of coal would seem to give to such an enterprise assurance of success, if properly managed.

#### A New Railroad for Siberia.

The United States Consul-General at St. Petersburg reports:

"A permit has been given for the construction of a new railroad from the Sosva River to Blagodat Mountain, which will connect Siberia with the Ural Railway and with the future Perm-Kotlas-St. Petersburg Railroad. This will be the shortest railway between the Obi and Volga system and the North Dvina. The project of connecting the River Sosva with the Ural Railroad was advocated at the time of the construction of the latter, and in 1870 all preliminary surveys were made, at their own expense, by private parties who owned large iron works on the River Sosva; but, for reasons unknown, a privilege for the construction of this shortest way from Kama to Siberia, which shortens the present Ural Railway one-half, has been ignored and denied until now, when Siberia urges its necessity for the purpose of exporting its superfluous agricultural products. To understand the importance of this road, one has only to glance at the map. The large navigable River Sosva commands all the freight through the rivers Tavda and Irtysh, not only from North Siberia, but from the far south, beginning with the frontiers of China, on the Altai, to the Frozen Ocean, and ending with the Yenesei Government. This natural waterway lies so near the Ural that a railway of 470 versts (312 miles) over the Ural Mountains is adequate to transport all the cargoes from Siberia to Kama, whence it can be forwarded by water to Yaroslavl and by rail or water to Sukhona, and thence have access to the markets of western Europe through Archangel and the ocean, after freighting of only 1,000 versts (663 miles) between Sosva and North Dvina. There is no doubt that this direct connection between Sosva and North Dvina will be welcomed by the inhabitants of Siberia, as it will be of great

#### PRODUCTION AND VALUE OF UNITED STATES MINERALS.

	1890.		1891.		1892.		1893.		1894.		1895.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
<b>Metallic.</b>												
Pig iron, value at Philadelphia (long tons).....	9,202,703	\$151,200,410	8,279,870	\$128,337,985	9,157,000	\$131,161,039	7,124,502	\$84,810,426	6,657,388	\$65,007,247	9,416,308	\$105,198,550
Silver, coinage value (troy oz.).....	54,500,000	70,464,645	58,330,000	75,416,565	63,500,000	82,199,150	60,000,000	77,575,757	49,501,122	64,000,000	47,000,000	60,766,309
Gold, coinage value (troy oz.).....	1,888,880	2,845,000	1,604,840	33,175,000	1,596,373	33,000,000	1,739,081	35,950,000	1,910,816	39,500,000	2,273,639	47,100,000
Copper, value at N. Y. City (lbs.).....	265,115,133	30,848,797	295,812,076	38,455,300	353,275,742	37,977,142	337,416,848	32,054,601	360,841,218	39,111,141	381,106,668	38,682,347
Lead, val. at N. Y. City (short tons).....	143,630	12,668,166	178,554	15,341,198	173,654	13,892,320	163,982	11,839,590	159,331	9,942,254	161,144	10,655,040
Zinc, val. at N. Y. City (short tons).....	63,683	6,266,407	80,873	8,033,706	87,760	8,027,926	78,632	6,306,600	75,328	5,288,026	59,686	6,278,020
Aluminum, val. at Pittsburgh (lbs.).....	61,281	61,281	150,000	100,000	259,885	172,824	339,629	266,903	550,000	316,250	920,000	464,600
<b>Non-Metallic.</b>												
Bituminous coal (short tons).....	111,320,016	110,420,801	117,901,237	117,188,400	126,856,567	125,124,381	128,385,231	122,516,618	118,320,405	107,653,501	135,118,193	115,749,771
Pennsylvania anthracite (long tons).....	41,489,838	66,383,772	45,236,992	73,944,735	46,850,450	82,442,000	48,185,306	85,687,778	46,358,144	78,438,163	51,785,122	82,049,272
Building stone.....	47,000,000	47,000,000	47,204,746	47,204,746	48,706,625	48,706,625	48,706,625	33,885,573	37,055,030	37,055,030	34,688,816	34,688,816
Petroleum (bbls).....	45,822,672	35,365,105	54,291,980	30,526,553	50,509,136	26,031,196	48,412,663	28,932,326	49,344,516	35,522,695	52,983,526	57,691,719
Natural gas.....	18,742,725	18,742,725	15,596,084	15,596,084	14,800,714	14,800,714	14,800,714	14,316,250	13,951,400	13,951,400	13,951,400	13,951,400
Cement (bbls).....	8,000,000	6,000,000	8,222,792	6,680,951	8,758,621	7,152,750	8,002,467	6,262,841	8,362,245	5,030,081	8,731,401	5,482,254
Mineral paints (long tons).....	47,732	681,992	49,652	678,478	51,704	767,766	37,724	530,384	41,926	498,093	51,375	618,352
Asphaltum (short tons).....	40,841	190,416	45,054	242,264	87,680	445,375	47,779	372,232	60,570	353,400	68,163	348,281
Corundum and emery (short tons).....	1,970	89,395	2,265	90,230	1,771	181,300	1,713	142,325	1,495	95,936	2,102	106,256
Graphestone ore (long tons).....	219,050	23,416	239,129	13,413	129,566	7,718	66,614	6,308	53,635	8,547	9,547	71,769
Manihote (lbs).....	77,500	77,500	110,000	110,000	104,000	843,103	63,252	918,000	64,010			80,400
Total value of non-metallic minerals.....		\$312,776,503		\$321,768,846		\$339,970,615		\$323,249,448		\$308,199,806		\$340,341,311
Total value of metallic products.....		305,735,670		300,232,796		307,716,239		249,981,866		218,168,788		270,453,979

double its market value as bullion. The table shows the quantity and value of certain leading products for six years.

#### Improvements on the Erie Canal.

Engineer Adams has completed the plans and specifications for the first piece of work to be accomplished under the \$9,000,000 appropriation for the improvement of the canal system of New York state. The plans are for that portion of the Erie Canal between and including locks 21 and 22 at Rexford Flats, a few miles below Schenectady. The locks are to be lengthened, and the canal is to be deepened 2 ft., while vertical walls are to be built between the locks. The work will cost \$160,000, and is soon to be advertised by Superintendent Aldridge, of the State Department of Public Works.

#### Electric Headlights.

The National Electric Headlight is being introduced in Texas by Mr. M. A. Ross. One has just been put on engine 141 of the Houston & Texas Central, and the Galveston, La Porte & Houston has ordered four. Mr. Ross states that one of these lights is on Dr. Webb's inspection engine and another one on C. D. Hammond's.

#### A Dry Dock Accident.

Last Saturday an accident occurred at the Brooklyn Navy Yard, an account of which is summarized below from the official report of the Commandant, Commodore Sicard.

The caisson of Dry Dock No. 2 suddenly left its groove and allowed the outside water to rush into the dock and fill it. It seems that for a day or two prior to the accident, the Department of Yards and Docks had been removing the ballast from the caisson of No. 2 for the purpose of substituting cement.

All the ballast had been removed, and the caisson seems to have been entirely empty—the tide was rising during the afternoon and early evening, and about 8 o'clock was rather higher than usual, when (presumably) the buoyancy of the caisson caused it to slip or spring upward in the groove, thus becoming quickly disengaged from the latter. This was, of course, followed by an instant rush of water into the dock, which carried with it the Ericsson, the Commandant's barge, and several scows and floats, and some lumber. The rush also set up a current or suction in the Wallabout, which parted most of the fasts of the Puritan and Terror, and one of those of the Atlanta. The Ericsson was carried by the rush of water into the dry dock, where she struck very far forward. She was then carried out of the dock by the reflux wave, and

they were assessed too high, in view of the losses which have followed the building of the street railroad lines.

The porter of a Pullman car on a southbound train of the Florida, Central & Peninsular was killed on the train, near Ocala, Fla., by two train robbers, early in the morning of Aug. 8. The porter, Henry Greenway, while going through his car, found the men robbing the sleeping passengers.

#### A New Ferryboat for the Pennsylvania.

The new double-decker ferryboat Camden, built at Louis Nixon's shipyard, Elizabeth, N. J., for the Pennsylvania Railroad Company, was launched on Aug. 11. The boat is designed to run between Camden and Philadelphia. It is 166 ft long and 50 ft. broad, with double screws, one at each side. Electric lighting will be used.

#### Eleven Months' Exports.

The statistics of the Treasury Department show that for the 11 months ending May 31 the total exports of manufactured articles were \$206,591,691, an increase of nearly \$40,000,000 for the corresponding 11 months of 1895. While about \$18,000,000 of this is due to the higher prices of petroleum and copper, yet there are gains all along the line.—*Bulletin U. S. Export Association.*

#### South American Notes.

The surveys for the proposed new line of railroad from Belize to the Western District of the Colony of British Honduras have been concluded, and the engineers have returned to England. Opinion in the colony is much divided over the question of constructing the road at the cost of the government.

During the year 1895 there were constructed in the state of Minas Geraes, Brazil, 240 miles of railroad, bringing up the total mileage in the state to 1,809.

An electric light company has just been organized at Espirito Santo do Pinhal, in the State of Sao Paulo, Brazil, with a capital stock of 150,000 mil reis, all of which was subscribed by citizens of that place. The municipality has contracted with the company for lighting the city at 12,000 mil reis per annum. Many of the Brazilian cities have installed electric light plants, which have paid handsomely, and many other cities are contemplating a similar improvement.

The new station of the Western Railway of Buenos Ayres is nearly completed. It is a handsome structure, simple in ornamentation, with all modern improvements, including electric lights. Its cost has been about \$175,000.

Messrs. N. M. Rothschild and Sons have invited subscriptions for the new Chilean loan of \$20,000,000, authorized by Congress for providing funds to complete certain railroads in the republic, to improve the general

service to agriculture, for Siberia is already producing so much grain that a cheap outlet for it to the international markets has become a necessity. The yearly emigration to Siberia is estimated, in round figures, at 100,000, and nearly all of these emigrants are agriculturists, finding there rich farming and agricultural lands. Therefore, to avoid overproduction of grain products, by the increasing population, Siberia is seeking an outlet for them."

#### Indiana Railroad Assessments.

The Indiana State Board of Tax Commissioners has completed the assessment of railroad property in the state. The assessment this year shows a total increase of about \$60,000, with 6,279.88 miles of main track, as against 6,267.52 miles in 1895. The total assessment for this year is \$156,259,260, as against \$150,199,465 for 1895. The assessment for main track this year is \$123,038,565 as against \$124,211,940 in 1895. In 1896 there were 232.36 miles of second track, as against 280.18 in 1895. The assessment for second track this year is \$5,526,950, as against \$3,411,500 in 1895. There were 1,969.15 miles of side track in 1896, assessed at \$7,728,360, as against 1,914.61 miles in 1895, assessed at \$7,543,475.

#### Baggage in Europe.

The arrangements for carrying baggage in Europe are unlike those in vogue in this country in many particulars, and yet are not sufficiently different to cause much embarrassment to American travellers. The free transportation of baggage is almost unknown, although on some lines a small amount is exempted from charge. We refer to trunks, not hand baggage, the latter being always free unless excessive in amount. Hand luggage being carried free, passengers take with them into their compartments a quantity of such impediments far in excess of anything known in this country. The amount of rack space provided for each compartment, holding, say, eight persons, is often equal to that provided in half an American passenger car, and the racks are properly well filled.

In checking trunks on the continent the passenger is given a receipt for the amount he pays, on which receipt there is a number printed in large type. On all trunks or packages covered by the receipt a small piece of paper with a corresponding number is pasted. At the end of the trip the passenger presents his receipt and all trunks or packages with the corresponding number are delivered to him. The practice varies slightly on different lines, but in minor details only.

Cabs and special omnibuses are run in connection with many of the great stations in England and on the Continent which may be ordered to call at any hotel or private residence for passengers and baggage. They may be secured to convey passengers and baggage from the station either on arrival or by telegraphing in advance. The baggage-express system so general in this country



has been practically unknown, but from an article which appears in the May issue of the *Bulletin of the International Railway Congress* it appears that the Western Railway of France, as well as the Paris, Lyons & Mediterranean, which is the great trunk line leading from Paris southeasterly to the Riviera, Switzerland, Italy and the East, has now in operation a system very much like our baggage-express system. It is operated by a passenger agency, the "Indicateurs Duchemin" Company, and the passenger ordering a trunk taken from his house to the railroad does not have to pay for the service until he reaches the ticket window ready to start on his journey.

The rate is fixed according to the weight of the luggage; in Paris, 6 cents for every 22 lbs. or fraction thereof, with a minimum of 48 cents; in the country, 4 cents for the same weight with a minimum of 38 cents. —*Official Railway Guide.*

#### A Comprehensive Petition.

Every railroad manager is familiar with the fact that the people who ride on railroads have very emphatic, if not well-defined, views as to what the railroads ought to do for them; and the manager who has to deal with suburbanites or others who ride on his road every day constantly encounters the quintessence of the exacting spirit which not only wants everything imaginable but feels rather sorrowful after getting it, because the unfortunate railroad people are so lamentably lacking in wisdom, common sense and the knowledge of how to run a railroad. The following extract from a supposititious petition has been sent to us by a superintendent who now and then meets this kind of people. While not forgetting that railroad officers sometimes give passengers good cause for growling, we print the petition as a balm for the spirits of those of our readers who are not themselves equal to the task of defining their feelings.

#### To the Management of the Broken Back & Wrecked End Railroad:

The undersigned residents of . . . desire to impress upon the management of the Broken Back & Wrecked End Railroad Company the urgent necessity of improving its service, bad management being evident in all details:

##### WHAT WE WANT.

- Cars on one minute headway.
- Speed of 60 miles an hour.
- A stop put to reckless running.
- Private cars for every passenger.
- Free buffet, reclining chair and sleeping cars fitted with library, bath, barber shop, stock tickers and observation compartments.
- Annual passes.
- Stock and bonds of company divided pro rata among patrons.
- Tracks laid to our doors mornings and evenings and removed in the interim.
- Gentlemanly employees.
- Free homes on line of road, with taxes paid.
- Electric light and heat in winter and electric fans in summer.
- Cars to wait for passengers coming across lots within the half-mile zone.
- Fenders on both ends of all cars while running.
- Cars not to make any noise after we go to bed.
- Boy on mule ahead of every car while in motion to warn foot passengers and scorchers off the track.
- Blue grass lawn and tropical plants along the right of way.
- Boudoir cars for ladies.
- Free telegraph franks.
- Flagmen at all crossings.
- Interlocking switches.
- All our freight and express deadheaded.
- Smoking cars and free cigars on all trains.
- Cars to come to a full stop at all streets, lanes and private farm crossings.
- Free fire, life and accident policies.
- All cars to leave all stations on the hour,  $\frac{1}{4}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$ , in order that we need not bother ourselves to remember such odd times as 9:24, 9:36, etc.
- These are a few of the more modest concessions that we demand, and if not granted we pledge ourselves to buy wheels and boycott the road.
- The petition is signed by residents along the line of the road in the settlements of Lonesomehurst, South Lonesomehurst, Kickerville, Cranktown, Van Hide Manor, Bath Tub Corners, Soft Maple, Hardscrabble and New Utopia, by business men of these villages and by large property owners of the suburbs whose interests are jeopardized by the bad transportation facilities afforded by the road.

#### Lake Notes.

A plan is under way for the construction of two large steamers for the passenger trade between Chicago and Milwaukee, each to have passenger accommodation for 500 cabin passengers and some freight. They are to be night boats and the intention is to build one of them, if possible, for the season of 1898.

Traffic on the lakes has dropped off greatly the past week because of the shrinkage in ore freight. All of the Lake Superior iron-ore ranges are shutting off production, some of them as much as half, and the vessels now in the ore trade are almost entirely those with contracts at fair prices. On the Marquette range this week four switching crews are doing all the work at the two important mining centers, as against 12 ten days ago. On the Gogebic scarcely a mine is running full and the largest are closed. On the Minnesota ranges reductions have been the order of the week and shipments are less than for any time this year. The same is true of the Menominee. There will probably be great distress among the miners of the iron country next winter, for with their stockpiles not shipped the mines are not likely to do much work the coming winter.

Five of the new vessels of the Rockefeller fleet have now been launched at Cleveland, three within a few weeks. The sixth and seventh of the fleet will be launched this month. The rapidity of the construction of this immense fleet has never been equalled in America. It has been demonstrated that all of them will carry over 400 gross tons on a draft of 14.3 ft.

The Queen City, of Duluth, last week took from Chicago, on a draft of 16.5 ft., 5,656 tons of corn. The same vessel has carried 4,550 net tons of ore from Duluth to Chicago on a draft of 14.5 ft.

Shipments of iron ore from Lake Superior up to July 1 had aggregated since the beginning of the trade, in 1845, almost an exact 100,000,000 gross tons. Of this about 62 per cent. has been shipped in the past 10 years. Notwithstanding the fear expressed a few years ago that there was to be an immediate famine of Bessemer ore such have been the discoveries made on the older ranges since that time, by the use of the diamond drill and by intelligent prospecting that there is now in sight at these mines more ore of the grade from which steel can be made than ever in their history, and more than the total amount they have shipped, and the Mesabi alone has more Bessemer ore in sight than has been shipped

from all ranges since the beginning. Even the first opened and most steadily worked of the lake mines have to-day a better showing than ever before. The permanence of the ore deposits of the Lake Superior country can be realized from these statements.

In a paragraph published under this heading in our issue of July 10, it was stated that the 335,000 tons of ore carried over the Duluth, Missabe & Northern road to Duluth in June last was the heaviest monthly shipment to Duluth or any other Minnesota port. It should have been 375,000 tons. The original figure is corrected by Mr. Thomas Owens, Superintendent of the Duluth & Iron Range Railroad, who sends figures of the iron ore hauled to Two Harbors docks, showing that the shipments in June last to that port were 366,703 tons. Other high monthly records are those of June, 1895, 343,218 tons; July, 371,369 tons, and August of the same year, 426,398 tons.

The St. Mary's Falls canal for last month passed a total of 2,727,869 tons of freight, the largest amount of any month in its history. For the present season, three months, it has passed 8,165,281 tons. Now that the new 21-ft. lock is completed the cargoes can be increased, as the depth available is 16 ft., which will add nearly 700 tons to the 14.5 draft permissible for most of this season, for any one of the largest craft. The iron ore passing through the canal this season has been 3,994,100 gross tons, and about 35,690,000 bushels of all sorts of grains, 3,545,000 barrels of flour and 1,485,000 tons of coal have gone into Lake Superior.

At Two Harbors last week three vessels carried away 10,905 gross tons of iron ore, the three largest cargoes ever taken out of the lake.

The 426 ft. steel ship Maricopa, for the Minnesota Iron Co., has had her trial trip and is on the way to take her first load.

Duluth grain receipts for the crop year have been 78,850,000 bu., and shipments have been about 10,000,000 bu. less, showing about the amount ground by local mills.

#### The Verdict on the Atlantic City Collision.

The jury impanelled by the coroner returned three verdicts fixing the blame for the collision of passenger trains at the crossing of the West Jersey & Seashore and Atlantic City roads at Atlantic City, N. J. One verdict agreed to by the whole jury states simply the fact of the collision between an express train of the Atlantic City road and an excursion train of the West Jersey & Seashore road at Meadow Tower, near Atlantic City, on July 30, at 6:48 p. m. One of the separate verdicts, signed by three jurors, blames Engineer Edward Farr, of the Atlantic City train, for not having his engine under control on approaching the crossing; the signalman, George F. Hauser, for exercising bad judgment in giving the excursion train of the West Jersey road right of way over a fast express, and John Greiner, the engineer of the West Jersey train, for not exercising greater care in crossing ahead of the express. The third verdict, signed by the other three jurors, blames only Farr.

#### Elevating Tracks in Philadelphia.

Chief Engineer Brown, of the Pennsylvania, has completed plans for the elevation of the tracks on Trenton avenue from Front and Norris streets to Frankford Junction, to abolish grade crossings. The city has appropriated \$900,000 for this work and the railroad company will contribute \$1,100,000. By the elevation of these tracks 30 street grade crossings and one steam railroad crossing will be removed, and the railroad company will be enabled to make considerably faster time. From the Kensington station, at Front and Norris streets, to a point north of the tracks of the Richmond branch of the Philadelphia & Reading road the elevated structures will be of open iron work to give light and air. Beyond that point the structure will be solid. The elevated structures will cross the principal streets with a clearance of 14 ft. and some of the smaller streets with 13 ft. The highest clearance will be over the tracks of the Richmond branch of the Reading road, north of Lehigh avenue, which will be crossed at a height of 20 ft. This extra height is to enable the city at some future day to carry the tracks of Richmond branch over Kensington and Frankford avenues, in which event the Reading tracks at the point of intersection with the Trenton branch will have to be raised 4 ft., leaving a clearance of but 16 ft.

All of the principal streets intersecting Trenton avenue at right angles will be crossed by deck bridges, while the smaller streets will be crossed by half-through girder bridges. The connection with the large freight yard of the company, at Front and Norris streets, will be accomplished by a steep incline beginning at an elevation of 13 ft. above Norris street and gradually running down to grade at the Harrison street end of the yard. The yard will be raised about 4 ft. above its present level, involving a large amount of filling. Connection with the Kensington passenger station at Front and Norris streets will be made by bringing the elevated tracks in on a level with the second story of the building. At the other end the elevated structures will begin to descend from Butler street until the present level of the Frankford Junction yards is reached. An elevated spur will be carried to a connection with the Delaware bridge line, just east of the bridge crossing Frankford Junction yards, which will enable the company to put on a frequent service to the seashore from the Kensington district of Philadelphia.

#### Santo Domingo Midland Railway Co.

This company was organized on June 9 under the General Railroad Laws of the State of New Jersey, to build and operate a road in the Dominican Republic, island of Santo Domingo. The company has a valuable concession from the Dominican Republic, including a grant of every second section of public land through which the road will pass. The route as surveyed commences at Manzanilla Bay, on the north coast of the island, and continues for some 150 miles to Azua, on the south coast, with branches through the Savaneta and San Juan Valley. The grading was commenced on March 24, 1896, and is being pushed to Savaneta, some 32 miles. This portion of the line is almost level, and no important streams are crossed. The ties and material for ballast are convenient. The graders are now about five miles from the coast. The territory opened up by the road is well timbered with logwood, mahogany, ebony, satinwood, sandalwood, fustic and hard pine. The land itself is rich and well suited to the cultivation of fruits, tobacco, coffee and sugar, but without railroad facilities is practically useless. As the road progresses colonists take up land along the route and dealers in hardwoods and dyewoods are waiting to cut and market the products. The officers of the company are Dudley Farlin, President; A. L. Fowler, Manager, and Seward Davis, Secretary. The company's New York offices are at 111 Broadway.

#### A Practical Point.

Many of the farmers of Eastern Washington are sincere advocates of free silver. They are equally sincere advocates of lower freight rates to the seaboard for

their commodities. There is no manner in which the two propositions can be reconciled. The interest on the bonded indebtedness of a railroad is a fixed charge which must be met. Nearly all the railroad bonds of modern issue are payable by their terms, principal and interest, in United States gold coin. With free coinage of silver, it will take nearly two silver dollars to equal one gold dollar. The interest charge of the roads would be practically doubled, and there would be no manner in which this increased cost could be met except by increasing freight charges correspondingly. There can be no escape from this. The difference could not be made up by reducing the wages of employees, because the reduction in the purchasing value of those wages which would follow free coinage would leave the wages as low as they possibly could go and leave the wage earner sufficient to live on. Free coinage of silver and higher railroad freight rates will make a good battle cry for the Populists among the farming districts of Eastern Washington.—*Seattle (Wash.) Post-Intelligencer.*

#### LOCOMOTIVE BUILDING.

The Seaboard Air Line has just received for use principally on its Carolina divisions, 12 heavy locomotives, from the Baldwin Locomotive Works. The engines are 10-wheelers, with 19-in. cylinders.

The Lehigh Valley has now received all of the 29 new engines which it has ordered from the Baldwin Locomotive Works in the last few months. The engines are being distributed on the various divisions.

#### BRIDGE BUILDING.

**Albany, N. Y.**—The contract for the new bridge which is to be built across the Schoharie River at the "Old Ferry," has been let to the Croton Bridge Company for \$9,900.

**Boyleston, Ia.**—It is reported that the Fair-Williams Co., Ottumwa, Ia., has been given the contract for a county bridge over Skunk River, at \$8,796.

**Buffalo, N. Y.**—A scheme is being considered for building a bridge from Buffalo to Grand Island. It is hoped that a bill will be passed next fall, permitting the building of a pier bridge, but in the case of its failure, a pontoon bridge is talked of. It is now announced that a company has been formed for the building of such a bridge, and that it has already secured the right of way over Rattlesnake Island.

**Butler, N. Y.**—Road Commissioner L. J. Douglass, of the town of Butler, has erected a new iron bridge over the stream on the South Butler Spring Lake road. The bridge in the village of South Butler near the basket factory will also be repaired.

**Carlisle, Pa.**—The court has instructed the County Commissioners to proceed with the erection of a bridge over Corrodoquinet Creek, at Geremeyer's mill.

**Cincinnati, O.**—Bids are asked until Aug. 31 for the substructure and superstructure of a bridge at Fern street over the Cincinnati, Lebanon & Northern. A. P. Butterfield is Clerk of the Board of Administration.

**Cumberland, Md.**—The County Commissioners have given a contract to build a bridge over Siding Hill Creek for \$784.90, one-half the cost to be paid by Washington County.

**East Liverpool, O.**—The City Council has decided to issue \$5,000 bonds to rebuild bridges and city property washed away by the cloudburst on July 31.

**Green Bay, Wis.**—It is said that bids will soon be asked for building a 180-ft. drawbridge; estimated cost, \$10,000.

**Greensburg, Pa.**—Council has passed an ordinance providing for a bridge over Jack's Run where it crosses East Pittsburgh street.

**Hartford, Conn.**—The second dry bridge west of Dannerlein's warehouse on Hartford avenue, which was examined Aug. 1 by Engineer Graves and a foreman of the Hartford Street Railway Company, is being repaired. The examination revealed that only about 15 per cent. of the piles were perfectly sound and that only 12 per cent. more are sufficiently sound to withstand the vibration.

**Maquon, Ill.**—A wooden approach to the iron bridge south of the town has been completed, at a cost of \$1,673.50. The Road and Bridge Committee has recommended the building of an iron bridge in section 21, Chestnut township.

**Middleburg, Pa.**—The contract for the Middleburg and Fisher's Mill bridge has been awarded to the Wrought Iron Bridge Co., Canton, O., for \$1,900.

**New York, N. Y.**—A meeting of the East River Bridge Commission was held in New York, on August 5, both Mayor Strong, of New York, and Mayor Wurster, of Brooklyn, being present. It was decided to make a first request of \$250,000 from each of the two cities. This sum will start the tower on the New York side, which will be the first work begun.

**Niagara Falls, N. Y.**—An overhead crossing will be built at Pierce avenue at a cost not exceeding \$12,000.

**Pittsburgh, Pa.**—A new county bridge will be erected from Superior Mills, Scott Township, to Carnegie Borough, to cost in the neighborhood of \$30,000. It will be of iron and steel and will cross Chartiers Creek a few blocks above the town of Carnegie. The Board of Viewers has made a favorable report concerning the necessity for it at this point. This report will be sent to the next grand jury for adoption.

**Raleigh, N. C.**—The Board of County Commissioners of Wake County has decided to build a new bridge to replace the old one over the Neuse River, on the Battle road several miles north of Raleigh. The contract will be let this month.

**Reading, Pa.**—The County Commissioners have awarded to Nelson & Buchanan, of Chambersburg, the contracts for the superstructure of the new bridges at Dauberville and Hummel's Ford. Their bids were: Dauberville, \$740; Hummel's Ford, \$795.

**Rockville, Md.**—The contract for a 72-ft. bridge over the Baltimore & Ohio at Capitol View has been given to the Charleston (W. Va.) Building Co., at \$1,148.

**Titusville, Pa.**—Work has been commenced on the iron superstructure of the Halliday Dam bridge, by the Massillon (O.) Bridge Co. It will be a 125-ft. single span. Work has also been commenced on the superstructure of the three-span country bridge at Shaw's Landing.



**Troy, O.**—Bids will be received until Aug. 21 for a swing or hoist bridge over the Miami and Erie Canal on Plum street. E. E. Pearson is County Auditor.

**Wilkes-Barre, Pa.**—Controller Lloyd is asking for bids on the 28 new stonework bridges throughout the county. The appropriation is \$11,000 and all the bridges are to be arches of stone.

#### MEETINGS AND ANNOUNCEMENTS.

##### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

*Canadian Pacific*, semi-annual, 2 per cent. on preferred stock and 1 per cent. on common stock, payable Oct. 1.

*Chicago & Alton*, quarterly, 2 per cent. on the common and preferred stock, payable Sept. 1.

*Cleveland & Pittsburgh*, quarterly, 1½ per cent., guaranteed, payable Sept. 1.

*St. Paul & Duluth*, 2½ per cent. on preferred stock, payable Sept. 1.

##### Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

*Chicago Great Western*, annual, Chicago, Sept. 3.

*Chicago, Milwaukee & St. Paul*, annual, company's office, Milwaukee, Minn.

*Gray's Point Terminal Railway Co.*, special, St. Louis, Mo., Aug. 21.

*Elgin, Joliet & Eastern*, annual, Chicago, Sept. 15.

*Iowa Central*, annual, Chicago, Sept. 4.

*Louisville, New Albany & Chicago*, annual, New York, Sept. 9.

*Nashville, Chattanooga & St. Louis*, annual, Nashville, Tenn., Sept. 9.

*New York, Susquehanna & Western*, annual, Taylor's Hotel, Jersey City, N. J., Sept. 3.

*Toledo & Ohio Central*, annual, company's office, Toledo, O., Sept. 6.

*Wabash*, annual, company's office, St. Louis, Mo., Sept. 8.

*West Virginia & Pittsburgh*, annual, Weston, W. Va., Sept. 1.

##### Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Association for the Advancement of Science* will hold its forty-fifth annual meeting at Buffalo, N. Y., Aug. 22-29.

The *New England Roadmasters' Association* will hold its annual meeting at Revere House, Boston on Aug. 19 and 20. For programme see issue of July 31, p. 544.

The *Society for the Promotion of Engineering Education* will hold its annual meeting at Buffalo, N. Y., Aug. 20-22.

The *American Street Railway Association* will hold its annual convention at St. Louis on Oct. 24 and 25.

The *Roadmasters' Association of America* will hold its next annual meeting at the Cataract Hotel, Niagara Falls, N. Y., beginning Sept. 8.

The *Traveling Engineers' Association* will hold its next annual meeting at Minneapolis, Minn., commencing Sept. 8.

The *American Institute of Mining Engineers* will hold its annual meeting in Denver, Col., beginning on Sept. 21. For provisional programme see issue of July 24, page 530.

The *American Society of Railroad Superintendents* will hold its next annual convention at Niagara Falls, N. Y., beginning Sept. 9.

The *American Association of General Passenger Ticket Agents* will hold its next annual convention at Atlantic City, N. J., beginning Sept. 15.

The *Travelling Passenger Agents' Association* will hold its next annual convention at St. Louis, Mo., beginning Sept. 29.

The *American Railway Association* will hold its next annual convention at New York City, beginning Oct. 7.

The *Freight Claim Association* will hold its next annual convention at The Jefferson, Richmond, Va., beginning Oct. 7.

The *Association of Railway Superintendents of Bridges and Buildings* will hold its annual meeting at Chicago on Oct. 20. For programme see issue of Aug. 7, page 560.

The *Master Car & Locomotive Painters' Association* will hold its annual meeting at the Park Avenue Hotel, New York City, beginning Sept. 9. For programme see issue of Aug. 7, page 560.

The *Railway Signalling Club* will meet on the second Tuesday of the months of January, March, May, September and November, in Chicago.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m., except in June, July and August.

The *New England Railroad Club* meets at Westeyan Hall, Bromfield street, Boston, Mass., on the second Tuesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets in its rooms on the first Wednesday of each month, at 8 p. m., to hear reports, and for the reading and discussion of papers. The headquarters of the Society are at 1736-739 Monadnock Block, Chicago.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m., except during July and August.

The *Boston Society of Civil Engineers* meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

##### Western Society of Engineers.

The Entertainment Committee of the Western Society of Engineers, consisting of Mr. T. L. Condron, Mr. George P. Nichols and Mr. C. E. Schauffer, has arranged an excursion down the Chicago Drainage Canal to take place Aug. 15. A special train has been offered by the officers of the Atchison, Topeka & Santa Fe which will leave the Polk Street Station at 8.30 a. m., returning to reach the city at 5.30 p. m. A handsome illustrated pamphlet of 36 pages has been prepared descriptive of the work on the canal. This will be used as a guide of the trip, and copies will be distributed on the train as a complimentary souvenir. As this will probably be the last excursion to the canal by the Society before the completion of the work, arrangements have been made for an unusually large attendance by members and their friends. Lunch will be served during the day.

##### Society for the Promotion of Engineering Education.

The fourth annual meeting of the Society for the Promotion of Engineering Education will be held at Buffalo, N. Y., beginning Aug. 20. There will be five sessions, and there will be an excursion to Niagara Falls under the auspices of the Engineers' Society of Western New York. The following is the programme:

Thursday.—Meeting of council; reports and general business; President's address, Past and Present Tendencies in Engineering Education, by Mansfield Merriam; report of Committee on Uniformity of Symbols for Engineering Text-Books, I. O. Baker, Chairman; Agreement on Definition of Engineering Terms, Thomas Gray; Seminar Methods as Applied to Engineering Subjects, F. P. Spalding; An Experiment in the Conduct of Field Practice, F. O. Marvin; A Quarter Century of Progress in Engineering Education, Robert Fletcher; The Method of Teaching Perspective to Engineering Students, H. S. Jacoby; The Study of Modern Languages in Engineering Courses, T. M. Drown; A Course of Study in Naval Architecture, C. H. Peabody; The Elective System in Engineering Colleges, M. E. Wadsworth.

Friday.—The Desirability of Lectures to Undergraduates on the Ethics of Engineering, C. C. Brown; Quantity versus Quality in Smaller Colleges, Albert Kingsbury; Biology for Civil Engineers, G. C. Whipple; The Conservation of Government Energy in Promoting Education and Research, C. W. Hall; The Hale Engineering Experiment Station Bill, W. S. Aldrich; Is not too Much Time Given to Merely Manual Work in the Shops? W. H. Schuerman; How to Divide Subjects for Original Investigation Among Different Colleges, C. H. Benjamin; Report of Committee on Entrance Requirements for Engineering Colleges, F. O. Marvin, Chairman; Credit for Shop Experience in Entrance Examinations, W. T. Magruder; A Course of Study in Municipal and Sanitary Engineering, A. N. Talbot.

Saturday.—General excursion of the society to Niagara Falls and Lewiston, including visits to reduction works, power-plants and various other works of interest.

Saturday Evening.—Engineering Education in Japan, J. A. L. Waddell; Modelling as an Aid to Teaching Machine Design, G. W. Bissell; A Course of Study in Mechanical Railroad Engineering, H. W. Hibbard.

Business Meeting.—General business, appointment of committees, election of officers, meeting of council of 1896-97.

#### PERSONAL.

—Mr. Thomas Inglis, Master Mechanic of the St. Louis Southwestern, at Tyler, Tex., died at that town recently.

—Mr. W. J. Evans, Assistant General Freight Agent of the Great Northern, has been transferred to St. Louis as General Freight Agent.

—Mr. William S. McGowan, Jr., has been elected Treasurer of the Hancock Inspirator Co., of Boston, vice Mr. Edward P. Noyes, resigned.

—Mr. D. W. Church has been appointed Resident Engineer of the Pittsburgh Bridge Company, at Chicago, to succeed Mr. W. W. Curtis, resigned.

—James Dredge, Esq., editor of *Engineering* (London), has been appointed Commissioner General for Great Britain at the International Exhibition to be held at Brussels.

—Mr. J. Brinker, Assistant General Freight Agent of the Rio Grande Western, has resigned, and the office will be abolished. Mr. Brinker has been with the company for 10 years, having been five years in his last position.

—Mr. D. W. McLean, Master Car Builder of the Kansas City, Fort Scott & Memphis at Fort Scott, Kan., died a few days ago at Grand Rapids, Mich., after a protracted illness. He formerly had charge of the car department of the Missouri Pacific.

—Mr. Thomas S. McKinley, Roadmaster of the Evansville & Indianapolis road, was killed four miles south of Washington, Ind., on Aug. 4. While superintending work on the track one of the banks gave way and pinned him against a post, killing him almost instantly.

—Mr. W. F. Snyder, until recently General Western Agent of the "Big Four" road, with headquarters at St. Louis, has been appointed agent in charge of the Bay Ridge excursion department of the Baltimore & Ohio Railroad, relieving Gen. B. F. Bond, Division Passenger Agent, of those duties.

—Mr. W. H. Taylor, District Passenger Agent of the Southern Railway at Atlanta Ga., has been appointed General Agent of the Passenger Department at Norfolk, Va. This is a new position made necessary by the increasing traffic at Norfolk, and in addition to his other duties Mr. Taylor will have charge of the steamship lines.

—Mr. Dewitt C. Moon, Assistant Superintendent of the Dunkirk, Allegheny Valley & Pittsburgh road, has been appointed Superintendent of that line, with office at Dunkirk, N. Y. He succeeds Mr. C. H. Ketcham, resigned. The road is controlled by the New York Central & Hudson River road, but operated independently. Recently Mr. Edgar Van Etten, General Superintendent of that company, has been made General Superintendent of the smaller road.

—Mr. Joseph L. Wilkinson has been appointed General Manager of the Great Western Railway of England, Mr. Henry Lambert, General Manager since 1887, having been compelled to retire on account of ill health, which, indeed, has necessitated his absence from his office for more than six months past. Mr. Wilkinson has been in the railroad service since 1863, most of the time on the Great Western, although he was in South America for about three years previous to 1888 as Manager of the Buenos Ayres & Pacific Railway. He has been Chief Goods Manager of the Great Western for the past eight years.

—Mr. A. C. Hippey, General Superintendent of the Norfolk & Western, died at his home in Roanoke, Va., on Aug. 10, after a long illness. Mr. Hippey had been with the Norfolk & Western since 1890, in direct charge of the operation of the road under the General Manager, holding different titles at various times. Besides the Norfolk & Western, the Pennsylvania was the only railroad company of which Mr. Hippey had been an officer. Beginning as a Supervisor on the Northern Central and Baltimore & Potomac roads, he received the usual training and had the promotions of engineers on the Pennsylvania. He rose to be Engineer of Maintenance of Way on the Philadelphia & Erie and Northern Central, and then Superintendent of the Altoona Division of the Pennsylvania, holding that position, however, only a few months, until July, 1890, when he went to the Norfolk & Western.

#### ELECTIONS AND APPOINTMENTS.

*Atlantic Coast Line*.—G. G. Lynch has been appointed Assistant Superintendent of Transportation.

*Centralia & Chester*.—L. H. Coy has been appointed Car Accountant, vice J. E. Dean, resigned.

*Chester & Becket*.—The formal organization of the road took place at the Boston & Albany Company's offices in Boston last week. James A. Rumrill, of Springfield, Mass., was elected President; Fred J. Collier, of Hudson, N. Y., Clerk and Attorney; Charles E. Stevens, of Boston, Treasurer, and Chief Engineer, J. B. Haviland. The directors are as follows: Edward D. Hayden, of Woburn; Samuel Hoar, of Concord; James A. Rumrill, of this city; Zenas Crane, of Dalton, Mass.; Albert C. Houghton, of North Adams, representing the Boston & Albany road; Nathan A. Harwood, of Chester; William A. Harder, Jr., of Fred J. Collier, Smith Thompson, all of Hudson, representing the Chester Granite Company.

*Grand Trunk*.—J. T. Smith, Special Agent, has been appointed Claim Agent of the company, with headquarters in Chicago, succeeding Thomas Flynn, resigned.

*Litchfield, Carrollton & Western*.—General Manager McCall has issued a circular announcing that the office of General Freight and Passenger Agent has been abolished.

*Macon & Birmingham*.—E. R. Henderson has been appointed Auditor and Cashier, with office at Macon, Ga.

*Nickel Plate Line*.—N. Duke has been appointed General West-Bound Traveling Agent of the Nickel Plate Line, with headquarters at 866 Real Estate Exchange, Buffalo, N. Y.

F. P. Mogridge has been appointed Agent, with office 102 South Fourth street, Philadelphia, and will have charge of the east and westbound business of this line in Philadelphia and Philadelphia & Reading territory.

*St. Louis, Chicago & St. Paul*.—C. Millard has been appointed Chief Engineer, with office at Springfield, Ill. He will have charge of maintenance of way and buildings.

*St. Louis Southwestern*.—G. C. Montague has been appointed Superintendent of Telegraph, with office at Texarkana, Tex., vice S. F. Rawlins, appointed Superintendent Missouri Division, with office at Jonesboro, Ark. W. F. Kantz has been appointed General Eastern Freight and Passenger Agent, with office at 601 Tradesman's Building, Pittsburgh, Pa., vice W. H. Quigg, appointed Division Freight Agent, with office at Little Rock, Ark., vice A. R. Peyinghaus, resigned.

*Washington & Columbia River*.—Jonathan Evans has been appointed Master Mechanic, vice William Saxton, with headquarters at Walla Walla, Wash.

#### RAILROAD CONSTRUCTION.

##### Incorporations, Surveys, Etc.

*Charleston & Macon*.—The Charleston Security Construction Company has completed surveys of the first section of this road from Charleston to Allendale, S. C. It is announced by one of the officials that active work on the road will begin about Sept. 1, and that the road will be pushed as rapidly as possible to Allendale, where connection will be made with the Greenwood, Anderson & Western. This latter road, which already has about 65 miles completed, is now being extended.

*Cincinnati, Union City & Chicago*.—This project, which was abandoned a year ago, has been revived, and a party of Chicago capitalists have gone over the right of way out of Union City, Ind. F. W. Short and Judge N. W. Bliss, of Chicago, are among those now interested in the project. Twenty miles of right of way has been graded and ties are distributed along the grade from Union City to Huntington. About \$30,000 has been expended in preliminary construction.

*Columbia & Red Mountain*.—Over 500 men are at work on the grading of this road, from Northport to Rossland, Wash. The road is an extension of the Spokane Falls & Northern to the mines in southern British Columbia.

*Columbia River & Astoria*.—Honeyman, De Hart & Glenn, of Portland, Or., who have the contract for building this road from Astoria to Goble, Or., on the Columbia River, report that they now have 400 men at work on this section. It is proposed to double this force as soon as the men can be secured. The section of road now building is about 48 miles long between the Columbia River and the end of the existing road, about 10 miles from Astoria. A good deal of grading has already been done on the line toward the Columbia River.

*Des Moines & Kansas City*.—Preparations for changing the gage of the road between Des Moines and Van Wert, Ia., 72 miles, to standard are about completed, and the company will be running through trains from Des Moines to Keokuk over the standard-gage road this summer. The work of widening the gage south of Van Wert to Cainsville, 40 miles, will then be taken up. The Des Moines & Kansas City is a north and south road, 112 miles long, from Des Moines to Cainsville. It is operated in connection with the Keokuk &



Western, standard gage, extending from Van Wert to Keokuk, Ia.

**Green Bay & Western.**—Extensive improvements have been begun on the road by the new owners. It was formerly the Green Bay, Winona & St. Paul. Two large bridges on the Stevens Point branch are being filled, a steam shovel and two trains being employed in this work, which it is expected will be completed in a few weeks. Forty-seven miles of rail will be laid between Hixton and Marshland. At the western end of the line, a 60-lb. section is to be used, and the work will be finished in September. This will replace the only stretch of old rail on the road and will put the track in good condition.

**Long Island.**—It is said that the company will not extend the North Shore branch of the line from Great Neck to Port Washington. The extension was one of the improvements that the late Austin Corbin contemplated carrying out.

**Mexican National.**—The charter of the branch road from Monterey to Matamoras granted 10 years ago to the Mexican National has been declared forfeited, no work having been done.

**Mexico, Cuernavaca & Pacific.**—An additional 20 kilometers of track has been completed, bringing the road within the boundaries of the Hacienda de Tepetlapa in the State of Guerrero. The grading has been done by the contracting firm of Bell & Lemmes. The next point to be reached shortly is Buena Vista, 11 kilometers farther south and subsequently Igualá, 26 kilometers farther. Some very heavy work will have to be done, not less than 11 tunnels being required through the main canyon.

**Portland & Rumford Falls.**—A short branch is being built from the main line at Gilbertville, Me., south of Rumford Falls, to Chisholm's Mills, on the Androscoggin River. Six miles of the new road is now under construction, and four miles additional will soon be put under contract. The present contractors are McGregor Bros., Rumford Falls, Me., who have about one-third of their contract completed, and now have 200 men at work. About one mile of track has been laid. The work being done is of medium difficulty. The maximum grade is one per cent, and the maximum curve in the main line is five per cent. There will be one iron bridge in the new work, about 600 ft. long, across the Androscoggin River. The company is now operating 57 miles of road north of Lewiston, to Rumford Falls. The company's earnings have increased 20 per cent. in the past year over the preceding year.

**Portsmouth Belt.**—Surveyors are again at work on the Portsmouth Company's property, just south of the navy yard, at Portsmouth, Va., for the proposed belt road to connect all of the railroads entering the port. Five roads enter Portsmouth besides three seaside lines, and the belt line to facilitate traffic is needed. The scheme of a belt line around the harbor was agitated several years ago, but on account of opposition from property holders, was not carried out.

**San Francisco & San Joaquin Valley.**—All active construction work on the road will be abandoned as soon as the road is completed to Fresno, Cal., which will probably be by Aug. 15. The rails are now laid to a point about 16 miles from Fresno. The bridge over the San Joaquin River is about finished, so that the work of track-laying will not be interrupted. The grading is nearly completed to Fresno, and as soon as that work is finished, the men now employed by Grant Brothers and J. D. McDougall, the contractors, will be discharged. The directors have decided to do no more work on the construction of the line up the San Joaquin Valley until they can place bonds on the market.

The road is in a very incomplete state, buildings not being erected and the road not being ballasted, but trains began running on the first of this month to the station Le Grand, and within a month will be running as far as Fresno. South of this point little or no construction work will be done until after the election. Surveys have not as yet been made to connect Stockton with San Francisco, but this is part of the proposed plans. The distance from Stockton to Fresno is 125 miles. From Fresno to Bakersfield two lines are projected, and these will both probably be built. Rights of way are now being procured over both routes. The estimated distance from San Francisco to Bakersfield is 350 miles. This, of course, cannot be definitely determined until the location is decided upon between San Francisco and Stockton.

**Southern California.**—The California State Board of Railroad Commissioners is in session at San Diego to inquire into the complaint of the local property owners for the rebuilding of the company's washed out line through Temecula Canyon, eight miles, to connect San Diego with San Bernardino and the Atlantic & Pacific. The Commissioners were told that the bulk of the trade of Southern Riverside and Northern San Diego counties now goes to Los Angeles and other towns, instead of to San Diego, while passenger traffic is greatly impeded. The railroad company alleged that the line through the canyon is impracticable, and that it has been washed out twice by floods. The people of that section are served, it declares, by the present road via South Riverside and Santa Ana, and it insisted that rates to and from San Diego and these points were the same as before. It is declared that large subsidies of land were given the railroad to build the line through Temecula Canon.

**Vancouver, Victoria & Eastern.**—J. H. Brownlee, C. E., of Vancouver, B. C., is in charge of a party which left Vancouver, B. C., last week, to make the preliminary surveys for this road to the Kootenay mines and the interior of the Province. The road is projected by McLean Bros., of Vancouver. Branch lines from Vancouver and Westminster will unite at Steveston, where the Fraser River is to be bridged to Ladner's. At Ladner's a line will run to near Point Roberts and connect by ferry with the Victoria & Sidney road. From Ladner's east the line will be along the height of land back of the river, and, passing through the Fraser Valley, cross the mountains at Hope; thence going across the Nicola and Okanagan valleys, through Boundary Creek and Kettle River districts to a point on the Columbia River, 325 miles from the coast.

**Washburn, Bayfield & Iron River.**—A meeting of the stockholders has been called for Aug. 10 at Washburn, Wis., to arrange for the immediate construction of the road as far as Iron River, Wis., about 40 miles from Lake Superior, this fall.

**Washington County.**—The State Railroad Commissioners last week approved the change in the location for the entrance of this line into Calais, Me., as desired by the officers of the railroad company. The Commissioners in their opinion stated that they believed that the new location would cost \$100,000 less than the line down the river to Robinson formerly approved.

**West Virginia Central & Pittsburgh.**—General Manager C. L. Bretz disposed of recent rumors regarding the extension east of Hagerstown, Md., stating that nothing will be done at present toward the extension of the line from Cumberland to Hagerstown.

**York Southern.**—Surveys are now being made for a southern extension of this road beyond Delta, Md., just beyond the Pennsylvania State Line to Bel Air, Md., and still further south of Magnolia on the Philadelphia, Wilmington & Baltimore roads. It is also proposed to build a branch of about 2½ miles on the main line into Dellsstown, Pa. Both these lines will be standard gage, the main line of the road now being 4 ft. 8½ in. gage.

### Electric Railroad Construction.

**Allegheny, Pa.**—At a meeting last week of the Pittsburgh & Allegheny Central and the Allegheny & Evergreen Traction companies further steps were taken to secure certain desired franchises on the Northside in Allegheny. Franchises for a large part of the route, extending from Duquesne way to the Evergreen road and out to the thoroughfare for some distance have already been secured, and are owned by the two companies separately. It is stated that when the entire route has been secured the companies will combine under the name of the Allegheny Central Traction Co.

**Altoona, Pa.**—Ordinances have been introduced in the City Council to grant the use of Eighteenth street to the Altoona, Mountain Spring & Ashville Electric Railway Co., and the use of Sixteenth street to the Altoona Suburban Traction Co. Both have been referred to the department of highways and sewers.

The Altoona Suburban Traction Co. intends to begin work at once on a line from Altoona to Ashville, Cambria County, a distance of nine miles. The route, which is to run through a picturesque region, has been surveyed.

**Atlantic City, N. J.**—The Atlantic City Railway Co. has asked for the right to lay tracks for an electric line from the beach at the foot of South Carolina avenue to Arctic and up Arctic avenue to the Inlet. The taxpayers along the proposed route are strongly opposed to the road.

**Baltimore.**—Mr. George R. Webb, President of the Falls Road Electric Railway Co., has submitted the plans for a new route along North avenue to Kelley avenue, by crossing the tracks of the Northern Central Railroad on an overhead structure. The Commissioners will investigate the proposed route before granting the franchise.

The Baltimore, Gardenville & Bel Air Electric Railway Co. has been incorporated for the purpose of constructing an electric road on the Bel Air Turnpike.

An extension of the system of the Central Passenger Railway Co. in the suburbs of Baltimore will require 17 miles of single-track construction. Grooved rails weighing from 90 to 95 lbs. to the yard will be used and 900 iron poles with about 15 miles of cable for the conducting feed wires will be required. The estimated cost of the proposed construction is \$500,000. George Blakiston, of Baltimore, is President of the company.

**Bradford, Pa.**—An ordinance has been favorably reported upon which gives the Bradford Electric Street Railway Co. the right to build a line on East Main street, between the American House and the city limits.

**Carlisle, Pa.**—Work has been commenced on the extension of the electric road from Carlisle to the boiling springs, six miles distant. The right of way was secured the first of May.

**Chicago, Ill.**—The street car line on Clark street, between South Water and Washington streets, has been changed to an electric road.

Mayor Swift has signed the ordinance of the West and North Chicago Street Railroad Companies referred to among our construction notes July 10. The companies have accepted the ordinance and construction of the new electric lines will be commenced very soon.

**Cleveland, O.**—A site has been selected for the power-house of the Lorain & Cleveland Railroad Co. The right of way has nearly all been secured between Cleveland and Lorain. The road was chartered November, 1895, with a capital stock of \$50,000.

**Columbia, S. C.**—The Columbia & Eau Claire Electric Railway Co., has been incorporated with a capital stock of \$50,000 by F. H. Hyatt, Charles W. McCreery and others.

**Ellicott City, Md.**—On July 30, suspension of work was ordered by the contractors on the Columbia & Maryland Railroad in Howard and Baltimore counties, also on that portion of the line from Muirkirk to Laurel, the larger part of which has been graded by L. L. Bush & Co., of Laurel, Pa. No reason has been given for the order to discontinue work. It is believed, however, that work on the power-house at Ilchester will be continued.

**Hagerstown, Md.**—The Hagerstown Electric Railroad was successfully opened to Williamsport Aug. 8. The road is six miles long and the fare for the round trip is 20 cents. The power-house is located at Williamsport, the plans of which were prepared by Foote & Lloyd, of Harrisburg.

**Ligonier, Ind.**—We are informed that the construction of an electric railroad between Goshen and Plymouth will be begun at an early date. The survey has been completed and the capital is available for the building of the line. The power-house will be located at Bremen.

**Ludington, Mich.**—It is stated that an electric road will be built from Ludington to Hart, a distance of about 18 miles, to enable Oceana County fruit growers to ship their fruit to Milwaukee by the way of Ludington.

**Lyons, N. Y.**—The Wayne County Traction Co. has been incorporated to construct an electric road between Lyons and Newark, a distance of about six miles. Among the officers are: President, A. C. Robertson, Athens, Pa.; Vice-President, O. F. Thomas, of Lyons; Secretary, D. N. Johnson, Athens. F. N. Dean, Ithaca, N. Y.; Burton Hammond and Chas. T. Ennis, of Lyons, are among the directors. Capital stock, \$200,000, divided into 600 shares of \$100 each.

**Marietta, O.**—The Marietta Electric Co. has been incorporated by Nelson Moore, Andrew L. Gracey and others of Marietta to build an electric road.

**Milwaukee, Wis.**—The Mayor of Milwaukee has signed the franchise of the Milwaukee & Waukesha Street Railway Co., which was referred to in our issue of July 24. The road will be about 20 mi.-s long, and it is expected that it will be completed within the next year. Estimated cost \$2,000,000.

**New Castle, Pa.**—The New Castle & Mahonington Street Railway Co. was chartered on Aug. 4 with a capital stock of \$12,000. The road will be about two miles in length and run from New Castle to Mahonington, Lawrence County. President, DeWitt Dilworth, New Castle; Directors, Joseph W. Bradley and William Cummins, New Castle, and others.

**Pittsburgh, Pa.**—The Park Avenue Street Railway Co. has been incorporated to build an electric road on Park and Franklin avenues. Capital stock \$6,000. Among the incorporators are A. W. Elrius, of Pittsburgh, and James A. McDevitt, of Lancaster.

**Portland, Me.**—Work will be started soon on the Delano Park extension of the Portland & Cape Elizabeth road. It is the intention of the managers of the road to have a large part of the work done by fall.

**Pottstown, Pa.**—Arrangements have just been completed by Arthur C. Ash and H. G. Clay, representing the Pottstown & West Chester Electric Railway Co., for the building of its electric line between Pottstown and West Chester, a distance of 28 miles. The entire right of way has been secured and this company has ordered 50,000 iron ties. The power-house will be erected in West Nantmeal township.

**Reading, Pa.**—The Reading Traction Co. has a large force of men at work lowering its tracks on some of the principal streets in Reading.

**St. Louis.**—A bill has been introduced in the City Council to grant to the City Passenger Railway Co. a franchise which includes about 50 miles of single track for an electric road in St. Louis.

**Shamokin, Pa.**—The 4,000-ft. extension of the line of the Shamokin & Mt. Carmel Electric Railway Co., from Lancaster Switch to Maysville Park, which was begun July 1, has been completed. The new route shortens the distance from Shamokin to the park about 700 ft., and the line runs through a highly picturesque territory. There are two short trestles on either end of the branch.

**Shelburne Falls, Mass.**—The Shelburne Falls & Colrain Street Railway Co. is building a line to run from Shelburne Falls, through the manufacturing villages of Shattuckville, Griswoldville, Lyonsville, to Colrain Center, a distance of 6½ miles. Surveys are completed, the track laid for about 3 miles, and the contracts for all of the equipment have been let. The grading and track-laying are being done by H. W. Wright & Co., of Springfield, Mass.; the bridge masonry by F. F. Ley & Co., of Springfield; the bridges are being built by the Norton Iron Co., of East Everett, Mass., and the overhead equipment is in charge of the Hawkes Electric Co., of Boston. Two truss bridges, one 110 and the other 120 ft., are being built. T-rails, 56 lbs. to the yard, are being laid and the power-house is being equipped with Fitchburg compound engines, connected with two 75 K. W. Westinghouse dynamos. The capital stock of the company is \$50,000. D. W. Temple, of Shelburne Falls, is President.

**Staten Island, N. Y.**—On Aug. 6, the Staten Island Midland Railroad Co. received permission to lay a double track in Richmond Road from Broad to Oak street, for its new electric line.

### GENERAL RAILROAD NEWS.

**Blue Ridge.**—It is understood that Messrs. Thomas & Ryan, of New York, have now secured control of the bonds of this road and will extend it toward Knoxville. Trains through from Augusta to Walhalla will be put on as soon as Thomas & Ryan take the road, it is stated. Beyond Walhalla the Blue Ridge has been graded two-thirds of the way to Knoxville.

**Buffalo, Rochester & Pittsburgh.**—The earnings for the year ending June 30 are given as follows:

	1896.	1895.	Inc or dec.
Gross earn.....	\$3,141,886	\$3,028,216	I. \$113,670
Oper. exp.....	2,241,914	2,271,287	I. 13,827
Net earn.....	\$856,972	\$756,929	I. \$100,043
Other income.....	37,889	38,225	D. 336
Total increase.....	\$894,861	\$795,154	I. \$99,707
Fixed charges.....	777,217	752,483	I. 24,734
Surplus.....	\$117,644	\$142,671	I. \$24,927

**California Eastern.**—Judge Dillon, attorney for the company, on July 30 placed on record in San Bernardino County, California, a quit-claim deed from the old Nevada Southern to the above company, its successor in interest. The deed conveys the road, formerly the property of the Nevada Southern, now in operation between Blake and Marvel in San Bernardino County, California.

**Chicago & Eastern Illinois.**—The company reports earnings for the year ending June 30 as follows:

	1896.	1895.	Inc or dec.
Gross earn.....	\$4,014,623	\$3,667,889	I. \$346,734
Oper. exp.....	2,248,261	2,334,814	D. 86,553
Net earn.....	\$1,766,362	\$1,333,055	I. \$433,307
Other income.....	154,643	169,653	D. 15,010
Total income.....	\$1,921,005	\$1,502,708	I. \$418,297
Fixed charges.....	1,329,099	1,371,415	I. 42,316
Balance.....	\$591,906	\$131,293	I. \$460,613
Dividends p'd.....	289,842	289,842	—
Surplus.....	\$302,064	\$141,451	I. \$160,613

**Columbus Hocking Valley & Toledo.**—The stockholders of the company will, on Sept. 8, vote on a proposition to issue \$30,000,000 of four per cent. gold bonds, due on July 1, 1960. Of this amount, \$22,000,000 are to be reserved for the payment of bonds issued or to be issued under existing mortgages on the property of the company. Two and one-half millions will be exchanged for the issue of \$1,475,000 Ohio Land & Railway Company purchase money mortgage 20-year six per cent. gold bonds. For the exchange of \$300,000 of Wellston & Jackson Belt Railway Company first mortgage six per cent. gold bonds of \$1,000 each, at the rate of \$1,400 of the new bonds will be issued. About \$5,500,000 will be used for improvements, additions and enlargement. The directors, in presenting this plan, say that the present administration has, since 1889, increased the earnings to a point never before reached. The average annual gross income has been more than \$3,100,000; the net income, more than \$1,400,000.

**Duluth & Iron Range.**—The New York Stock Exchange has listed \$1,000,000 of the second mortgage six per cent. bonds of this company. These bonds are part of an issue of \$5,000,000 authorized to pay off and cancel \$3,500,000 of income certificates, for the paying off of other outstanding obligations of the company and for improvements and additions to the property. In the



application for listing these bonds the President of the company states that it has no floating debt, and that there is no lien ahead of the bonds except the first mortgage. The following statement of the operations of the company for the six months ending June 30 accompanies the application.

	1896.	1895.	Inc. or dec.
Gross earn.....	\$837,796	\$738,532	I. \$119,264
Oper. exp.....	583,735	417,321	I. 166,414
Net earn.....	\$274,061	\$321,211	D. \$47,150
Other income.....	5,586	.....	.....
Total income.....	\$279,647	\$321,211	D. \$41,564
Fixed charges.....	165,739	138,875	I. 26,864
Surplus.....	\$113,848	\$182,406	D. 68,558

**Erie.**—The Company reports earnings for all lines in June as follows:

	1896.	1895.	Inc. or dec.
Gross earn.....	\$2,618,091	\$2,450,411	I. \$167,680
Oper. exp.....	1,877,923	1,906,109	D. 28,186
Net earn.....	\$740,168	\$544,302	I. \$195,866

Included in the expenses of 1896 is one-twelfth of the entire taxes of the year.

**Fitchburg.**—The estimated earnings of the company for the year to June 30 are given as follows:

	1896.	1895.	Inc. or dec.
Gross earn.....	\$7,676,765	\$7,119,313	I. \$557,452
Oper. exp.....	5,462,316	4,970,706	I. 491,610
Net earn.....	\$2,214,449	\$2,178,547	D. \$35,902
Fixed charges.....	1,511,722	1,518,115	D. 6,393
Surplus.....	\$632,727	\$660,432	D. \$27,705

**Lake Erie & Western.**—The company is now equipping its freight cars with air brakes and M. C. B. couplers at the rate of 500 cars a month. This work was commenced in June, and is to be continued until all the cars are equipped with safety appliances. A good deal of work is also going on in the maintenance of way department, although no especially important improvement is being made this season. On the Northern Ohio, formerly the Pittsburgh, Akron & Western, which is now operated by the Lake Erie & Western, the track is being ballasted throughout with gravel, several miles of side-tracks put in, and a number of new water tanks and new passenger and freight stations built. Other improvements are being carried out to place that road in a generally good physical condition. On the Lake Erie & Western a number of gangs have been working for a long time constructing stone arches, abutments and piers for plate-girder bridges and others are laying iron pipe culverts, 16 in. to 48 in. in diameter.

**Manhattan.**—The company reports for the quarter ended June 30:

	1896.	1895.	Inc. or dec.
Surplus earn.....	\$361,599	\$379,799	D. \$18,200
Dividend.....	450,000	450,000	.....
Deficit.....	\$88,401	\$70,201	I. \$18,200

For the year ending June 30 the deficit, after paying dividends, was \$681,904, as against a deficit of \$281,954 for the previous fiscal year.

**Mobile & Ohio.**—The preliminary financial statement of the company for the year ending June 30 is reported as follows:

	1896.	1895.	1894.
Gross earn.....	\$3,619,071	\$3,269,989	\$3,253,692
Oper. exp.....	2,325,202	2,154,486	2,044,654
Net earn.....	\$1,293,869	\$1,115,503	\$1,209,037
In. rent, etc.....	1,059,632	1,034,354	1,037,323
Balance due.....	\$234,237	\$31,149	\$171,711
New eq'm't, etc.....	143,645	184,557	164,397
Surplus.....	\$90,592	\$105,408	\$7,317

The net earnings in 1895 were \$1,099,281.

**New York & Greenwood Lake.**—A prior lien mortgage for \$1,500,000 was recorded in New Jersey last week. The mortgage is given to the New York Security & Trust Co. to secure the payment of \$1,500,000 of gold bonds at five per cent. interest and is guaranteed by the Erie Railroad. The new lease of the road by that company is also recorded.

**New York, Ontario & Western.**—The preliminary report of earnings for the fiscal year ending June 30 is as follows:

	1896.	1895.	Inc. or dec.
Gross earn.....	\$23,704,870	\$21,412,116	I. \$2,292,754
Oper. exp.....	16,193,956	14,387,476	I. 1,806,480
Net earn.....	\$7,510,914	\$7,024,640	I. \$486,274
Other income.....	379,830	217,254	I. 162,576
Total income.....	\$7,890,744	\$7,241,894	I. \$648,850
Fixed charges.....	5,146,131	4,414,495	I. 731,636
Surplus.....	\$2,744,713	\$2,827,399	D. \$82,686

**Port Royal & Augusta.**—The foreclosure sale of this road has been definitely fixed for Sept. 1 and will take place at Beaufort, S. C., on that date.

**Toledo & Ohio Central.**—The company reports earnings for the year ending June 30 as follows:

	1896.	1895.	Inc. or dec.
Gross earn.....	\$1,941,573	\$1,903,989	I. \$37,584
Oper. exp.....	1,326,659	1,298,407	I. 28,252
Net earn.....	\$614,914	\$605,582	I. \$9,332
Other income.....	9,533	9,422	I. 111
Total income.....	\$624,447	\$615,004	I. \$9,443
Fixed charges.....	469,584	424,265	I. 45,319
Surplus.....	\$154,863	\$190,739	D. \$35,876

**Western, New York & Pennsylvania.**—The earnings for the year to June 30 were:

	1896.	1895.	Dec.
Gross earn.....	\$3,166,030	\$3,282,010	\$115,979
Oper. exp.....	2,233,911	2,292,835	\$58,924
Net earn.....	\$932,119	\$989,174	\$57,054

Included in the above expenses for 1896 are \$129,437, which in former years would have been charged to betterments, making an actual increase in net earnings, as compared with the same week in 1895, of \$92,382.

#### Electric Railroad News.

**Brooklyn, N. Y.**—The report for the quarter ended June 30 last, of the Nassau Electric Railroad Co., of Brooklyn, shows gross earnings from operation, \$465,252; operating expenses, \$277,449; net earnings from operation, \$187,801; other income, \$18,925; gross income, \$206,726; fixed charges, \$184,674; net income from all sources, \$22,052; cash on hand, \$184,657; profit and loss surplus, \$52,250.

**Cincinnati, O.**—A joint meeting of the stockholders of the Wayne Avenue and the White Line Street Car companies was held July 29, and the recent agreement consolidating the two lines was ratified. The consolidated will be known as the People's Line. The cash capital of the new company is \$1,100,000.

**Kansas City, Mo.**—The Northeast Street Railway was sold Aug. 6 at public auction to Ronald R. Conklin of New York for \$60,000. Mr. Conklin represents the holders of bonds of the first mortgage of \$292,000. By order of the court, the first money to be paid out of the \$60,000 will be the claim of \$17,000 of the Westinghouse Co. The electric road was chartered July 13, 1887. The property was ordered to be sold Nov. 15, 1894. The capital stock was \$260,000.

**Lancaster, Pa.**—Negotiations for the transfer of a controlling interest in the Pennsylvania Traction Co., from John J. Patterson to a New York syndicate headed by George S. Lee, were closed last week. It is stated that the improvements projected for the near future will require \$1,000,000. The whole system will be reorganized under the charter of the Keystone Traction Co., which charter the Pennsylvania Traction Co. already holds, having secured it for the purpose of reorganizing under it a very extended system. All of the outstanding bonds of the Pennsylvania Traction Co. will be called in, and in place of them will be issued bonds of the Keystone Traction Co., on terms yet to be agreed upon.

**Pittsburgh, Pa.**—Stockholders of the Second Avenue Traction Co. this week voted to lease its lines to the United Traction Co., which was chartered July 27. The Second Avenue Co. operates 63 miles of track, with 108 cars. Its lines reach out into the Monongahela River Valley and connect the towns of Rankin, Braddock, Brinton, Turtle Creek, McKeesport, Homestead, Hazlewood, North Homestead, Hope Church, Reynoldton, Dravosburg and Glassport.

Negotiations are now pending for the purchase of the lines of the Pittsburgh, Allegheny & Manchester Traction Co. by the United Traction Co., and when the deal is concluded the road will be operated by the Northside Traction Co.

**San Jose, Cal.**—The stock of the Allen Rock Railway Co., amounting to about \$20,000, was recently sold to Center & Co., who hold a mortgage on the road of nearly \$50,000.

**Savannah, Ga.**—A decree has been signed for the foreclosure and sale of the Electric Railway Co. of Savannah. A report for the 16 months of the receivership shows net earnings of \$5,000, which are double that for the previous 16 months. The authorized capital is \$1,000,000, \$600,000 of which has been issued.

#### TRAFFIC.

##### Traffic Notes.

The Pennsylvania secured nearly 1,450 passengers for an excursion train from Pittsburgh to Atlantic City on Aug. 6. The train was run in six sections, having altogether 34 sleeping-cars, 7 parlor cars, 21 day coaches and 4 baggage cars.

The time record for freight delivery between England and Chicago was broken last Monday, when a large consignment of goods reached a wholesale house in Chicago in 9 days and 15 hours after it left the dock at Southampton, on the American Line steamship St. Louis.

The Toledo, St. Louis & Kansas City last week made an excursion rate of \$15 between St. Louis and Put-In-Bay, near Toledo, the rate including hotel charges. The Wabash immediately made a rate of \$11 between St. Louis and Toledo which has been met by the Toledo, St. Louis & Kansas City. This is figured out as about equal to \$.25 for a haul of 872 miles.

A meeting of the Southern States Freight Association was held at the Windsor Hotel in New York on Monday of this week to discuss the attitude of the association roads in the present controversy between the Seaboard Air Line and the Southern Railway. President Spencer, of the Southern Railway, was present, but the Seaboard Air Line had no representative. The action of the conference was not made public.

The reduced rates of the Seaboard Air Line Railroad and steamboats were withdrawn Aug. 8 in accordance with the order of the United States Court, but soon after this withdrawal was announced it was stated that the rates on the steamers from Baltimore to Norfolk and Richmond had been still further reduced. It would seem from the reports that the order of the court does not apply to tariffs which cover only water transportation.

The passenger rates announced by the new Japanese Steamship Company, which has arranged to run steamers between the Pacific Coast and Yokohama, are equal to an average reduction of 10 per cent. as compared with the present rates of the Pacific Mail Steamship Company. The first of the company's steamers on the new route is to sail on Sept. 5, and monthly trips will be made for the present. Three ships for the line are building on the Clyde.

The Seaboard Air Line has published a pamphlet giving the correspondence which has passed between the company, the Baltimore Steam Packet Co. and the Southern Railway and others in connection with the circumstances which have led up to the rate controversy. There are altogether 53 letters besides telegrams and three summarized interviews. The correspondence begins in June, 1895, when the Seaboard Air Line took official notice of the decision of the Southern to make Norfolk the terminus of its Chesapeake Bay line steamers instead of West Point. President Hoffman, of the Seaboard, and President Spencer, of the Southern, interchanged a number of letters. A proposition of the Seaboard to pool the issues of the companies under certain conditions was refused by the Southern. An effort was also made to have Vice-President Thomson, of the Pennsylvania, act as arbitrator, but this also came to nothing. The existence of an agreement between the York River and Bay Lines, one feature of which was a penalty forfeit of \$75,000 in the event of one time bidding for business then controlled by the other, is brought out by the letters. The Seaboard Air Line made a demand for this forfeit. President Foster, of the York River Line, in reply said that the agreement had been annulled on July 9, 1881.

#### Chicago Traffic Matters.

CHICAGO, Aug. 12, 1896.

The past week will be long remembered by the officers of the roads west of this city. The Interstate Commerce Commission started in to investigate the reconsigning grain practice at Kansas City. Friday morning the *Inter-Ocean* published what was reported to be an "expose" of the investigation, which was in substance that a

money pool was in existence among the Western roads; that the Chicago Great Western had run \$90,000 ahead of its allowance in the game, and, refusing to even up, was being persecuted by the other lines in the pool, the latter trying to prove the Great Western guilty of rate cutting. President Stickney, of the Great Western, substantiated this report before the commission in every particular except as to the money-pool feature, claiming that the agreement provided for only a division of traffic. Mr. Stickney's evidence was sensational. He charged the pool with making Anarchists of Western farmers by exacting high rates and giving the grain dealers low cut rates. He said not a corn crop in the last 35 years had moved until the corn was in the hands of the dealers who "had the rate." Mr. Stickney acknowledged that the Iowa Development Company was a subsidiary corporation of the Great Western road organized for the purpose of buying grain along the territory of the line for shipment over the Great Western. General Freight Agent Stohr, of the same road, also acknowledged giving two rate concessions in grain shipments within the period covered by the inquiry, April 1 to Aug. 4. None of the other lines acknowledged giving cut rates. The investigation proved how carelessly, with regard to rates, grain at Kansas City is handled. Grain is brought in there at local rates, the expense bills for the same are traded in, and six months afterward the traffic or a like amount, for the identity of the grain is lost in elevators, may go forward at the balance of the through rate. Chairman Midgley, of the Western Freight Association, acknowledged that the system was inequitable and unjust and thought that it should be abolished and straight through rates substituted. He denied the existence of a money pool, but acknowledged an agreement for the division of traffic, but denied that he had ever attempted to enforce it by ordering diversions of traffic.

In agreeing to make Galveston, Tex., one of their ports the North German Lloyd and the Hamburg-American Companies agree with the Western roads not to handle immigrants destined for points West of Louisiana and Texas. The principal trans-Atlantic Steamship companies have made a proposition to the Western roads that the latter withdraw their agents from Europe, abolish their immigrant clearing house at New York and allow the steamship companies to handle the business from its inception to its division at New York. The railroads will agree to this, provided the steamship companies will withdraw their agents from the territory west of Chicago, allowing the roads to handle the east-bound immigrant business. The entire question will be discussed at a conference between representatives of the roads and steamships in New York early next month. The Southern Pacific has been offered 25 per cent. of the westbound immigrant traffic if it will join the Immigrant Clearing House Association.

The following tables show the receipts and shipments of live stock at the Union Stock Yards, Chicago, with the number of carloads carried by each road, during July:

RECEIPTS.			
Roads.	1896.	1895.	
Atchison, Topeka & Santa Fe.....	1,214	1,100	
Chicago & Alton.....	1,753	1,753	
Burlington.....	6,065	4,270	
Chicago, Milwaukee & St. Paul.....	2,442	2,442	
Chicago & Northwestern.....	3,669	2,763	
Chicago, Rock Island & Pacific.....	2,240	1,635	
Chicago Great Western.....	529	642	
Illinois Central.....	1,469	1,687	
Wabash.....	1,198	1,225	
Other lines.....	700	916	
Totals.....	21,339	18,816	
Increase.....	2,523		

SHIPMENTS.			
Roads.	1896.	1895.	
Baltimore & Ohio.....	315	111	
Erie.....	1,061	872	
Chicago & Grand Trunk.....	1,398	1,450	
Lake Shore & Michigan Southern.....	737	400	
Michigan Central.....	718	790	
New York, Chicago & St. Louis.....	227	48	
Pittsburgh, Cincinnati, Chicago & St. Louis	13	6	
Pittsburgh, Fort Wayne & Chicago.....	651	710	
Other lines.....	571	721	
Totals.....	5,691	5,081	
Increase.....	610		

The St. Louis & San Francisco has withdrawn from the Western Passenger Association on account of the non-membership of the Missouri, Kansas & Texas, the Kansas City, Fort Scott & Memphis, and the Kansas City, Pittsburgh & Gulf. The St. Louis & San Francisco was never a very strong member of this organization. A committee from the Western Passenger Association has been appointed to confer with the three outside lines and endeavor to secure their membership, thus securing that of the Frisco.

The \$30 round-trip rate, Chicago to Salt Lake, Utah, has caused no demoralization to speak of in the West. Very few of the tickets were sold from Chicago, and fewer found their way into scalping offices.

The Alton has received authority by the Western Passenger Association to run Sunday, or week-end, excursions into Chicago from local points on its line.

Total shipments to the East via lake last week amounted to 104,610 tons, of which 100,407 tons were grain. Owing to the low lake and rail rates from the West the bulk of the grain is going East via lake. During the past week there has not been enough vessels to meet the demand. Total all-rail shipments last week, exclusive of live stock, were 49,126 tons, compared with 46,480 tons for the preceding week, an increase of 2,646 tons, and against 46,415 tons for the corresponding week of last year. The proportions carried by each road last week were as follows:

Roads.	WEEK TO AUG. 8.		WEEK TO AUG. 1.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central.....	7,207	14.7	4,142	8.9
Wabash.....	4,080	8.3	5,300	11.4
Lake Shore & Mich. South.....	5,687	11.6	1,411	3.8
Pitta. Ft. Wayne & Chicago.....	5,331	11.9	5,102	11.1
Pitta. Cin. Chi. & St. Louis.....	4,667	9.5	5,156	11.1
Baltimore & Ohio.....	5,751	11.7	4,391	9.5
Chicago & Grand Trunk.....	4,697	9.6	4,746	10.2
New York, Chi. & St. Louis.....	4,327	8.8	4,203	9
Erie.....	5,426	11	5,152	11.1
C. C. C. & St. Louis.....	1,453	2.9	1,877	4
Totals.....	49,126	100.0	46,480	100.0

Of the above shipments 5,048 tons were flour, 12,135 tons grain, 12,627 tons cured meats and 9,386 tons dressed beef.